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Telephony

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POWER FOR SMALL COMPANIES

John Fox of Waldron (Mich.) Telephone Co. operating tractor and pole hole digger in building new line. See his story on savings in cost and time with use of this equipment on page 20.

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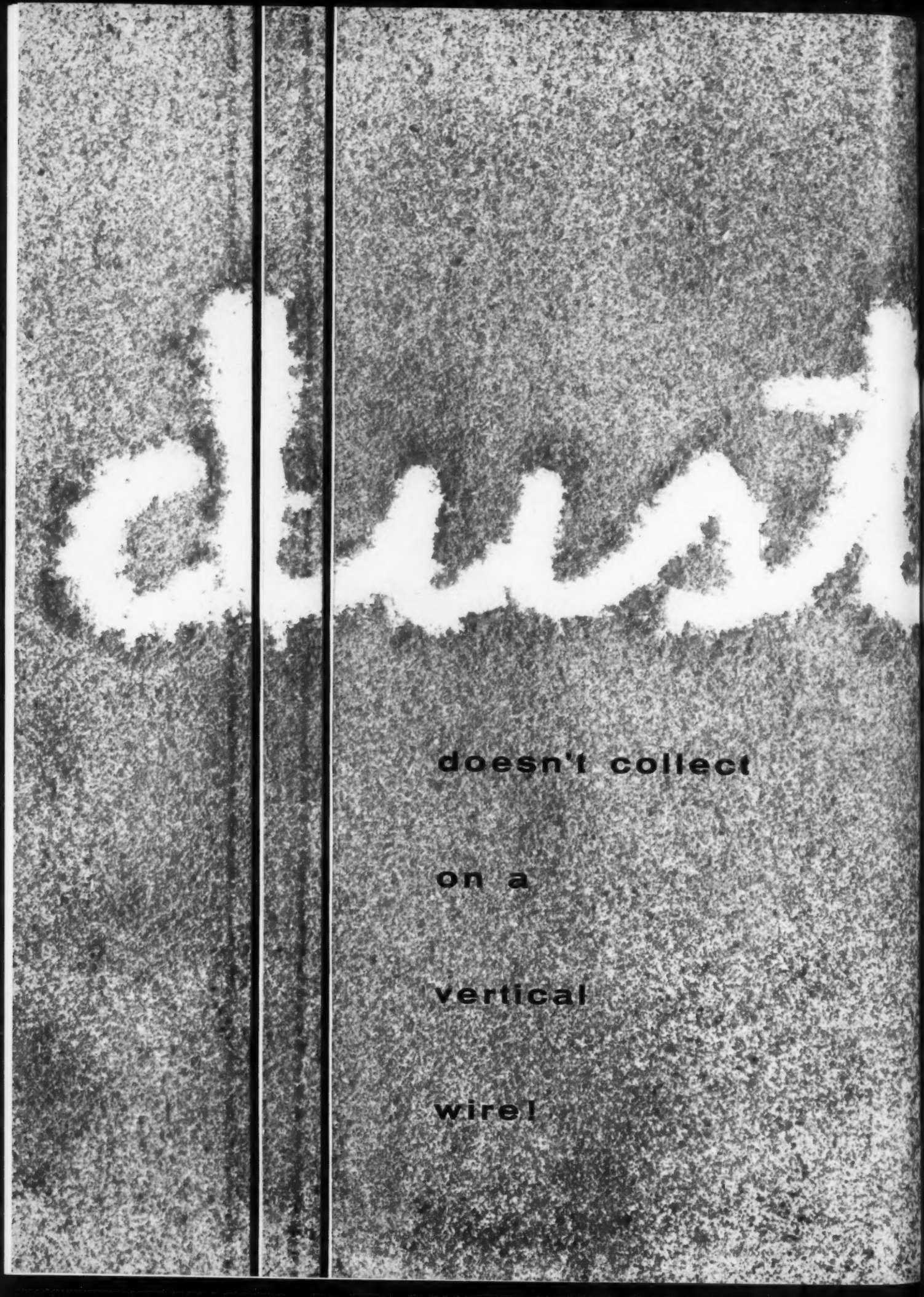
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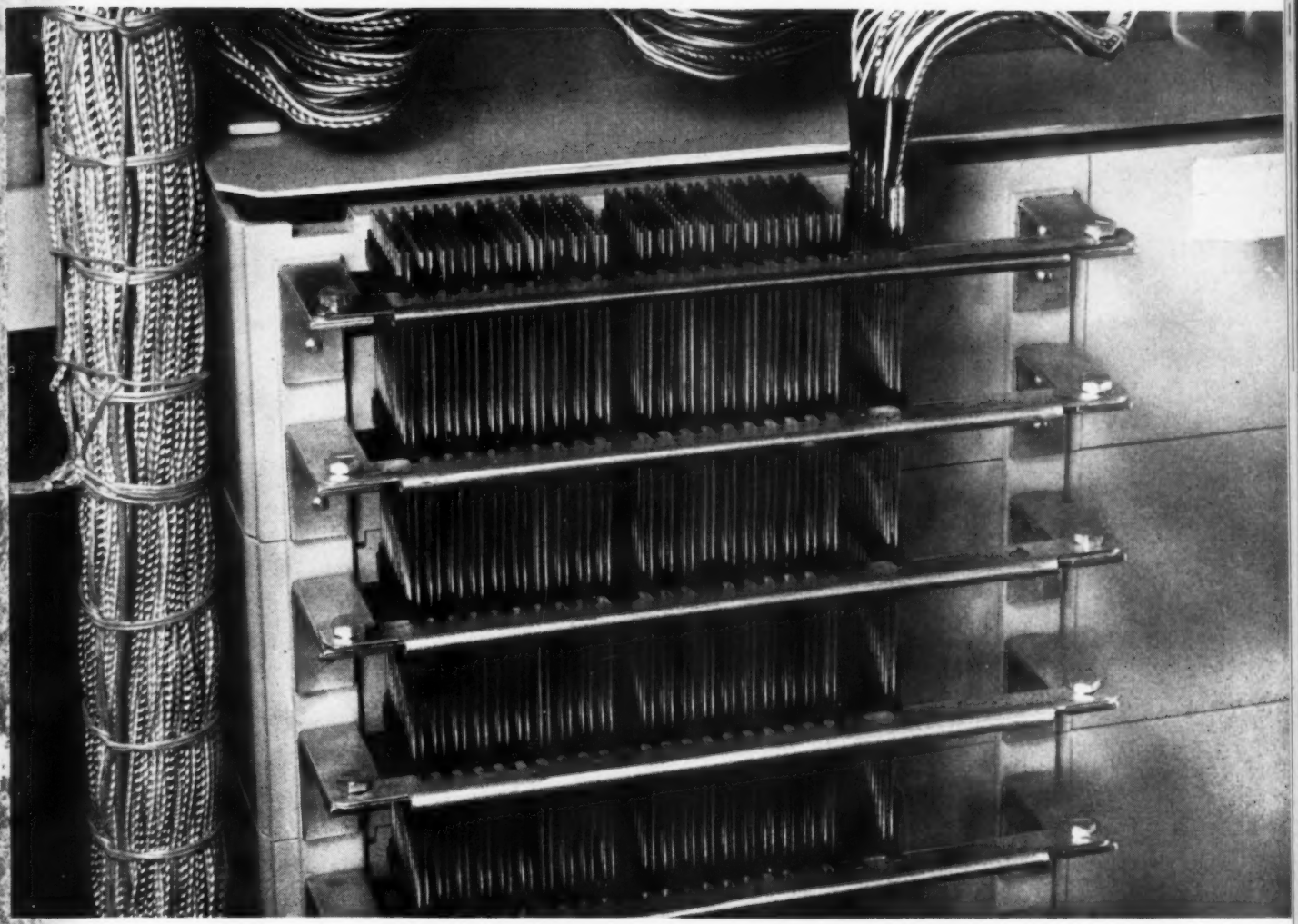

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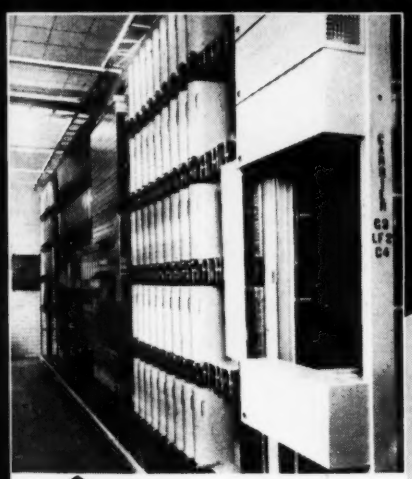

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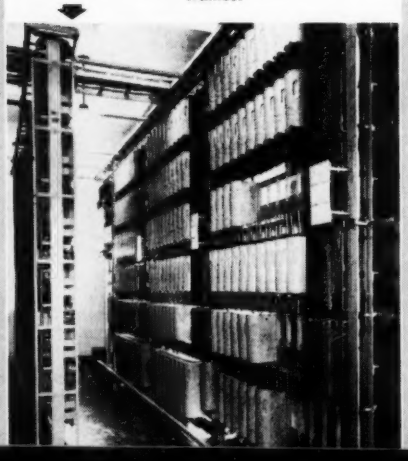

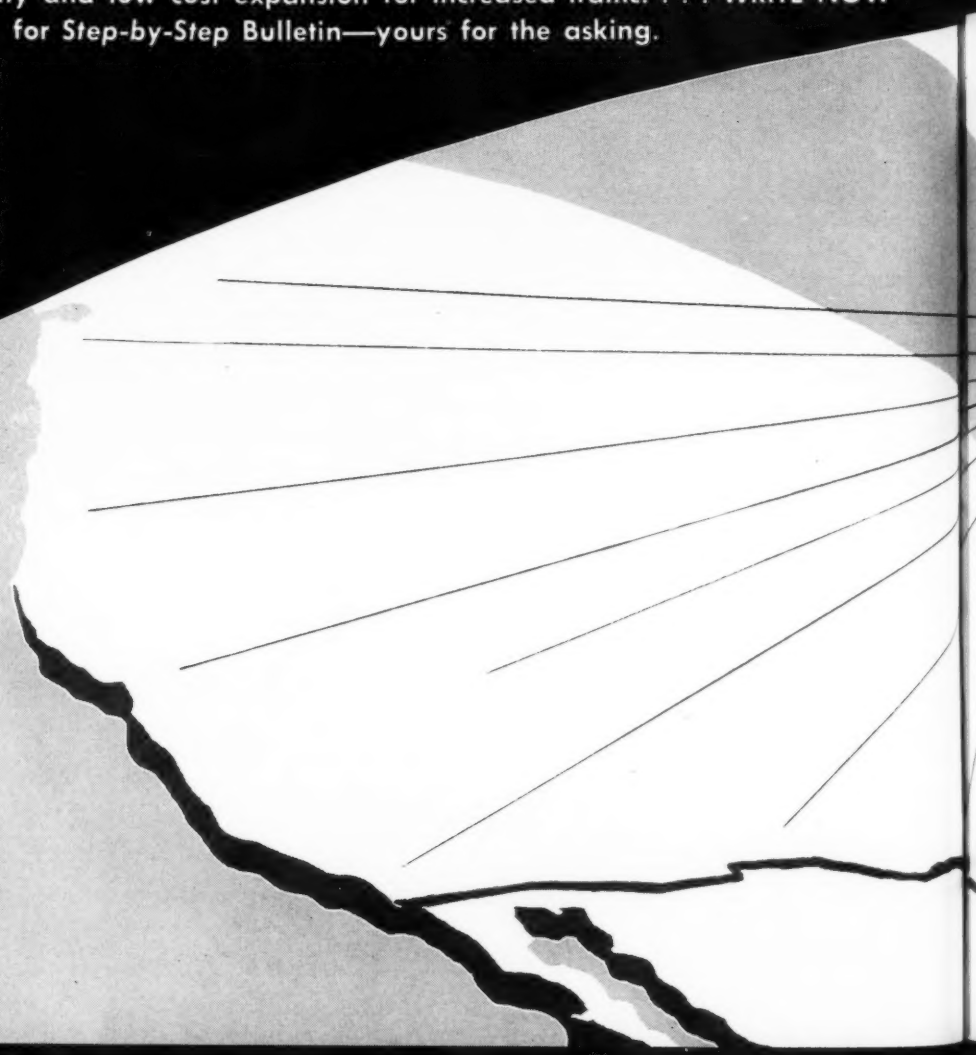

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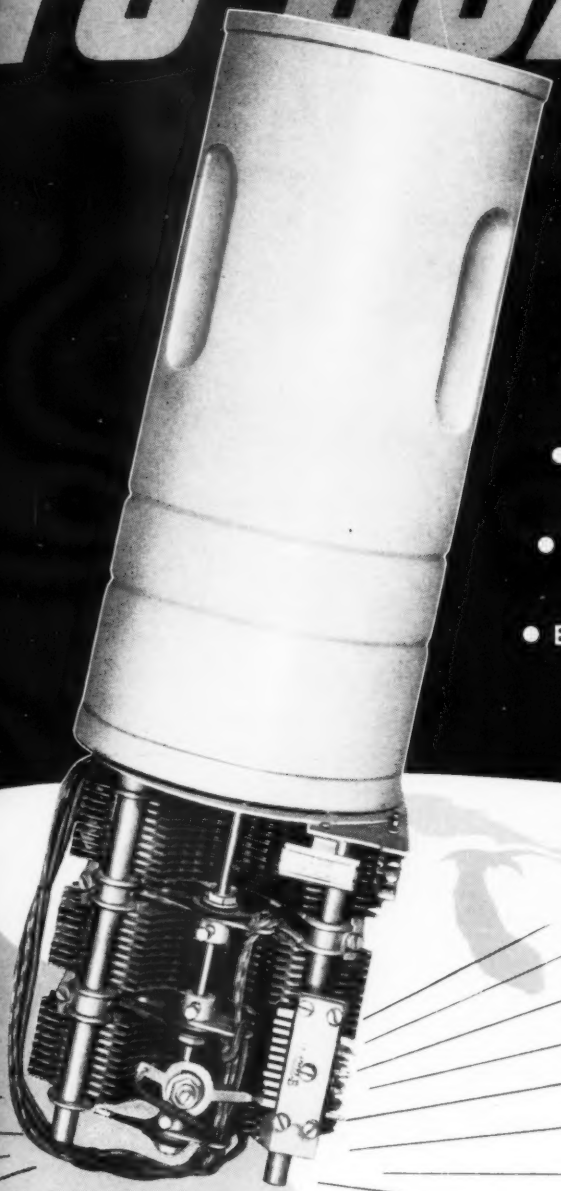
TO COAST...



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FLASHES AND PLUGS

LOCAL ANGLE. An item about the congeniality of telephone operators appeared in a newspaper recently and contained an unintentional typographical error. The item stated "For many years telephone operators have been known as having 'the voice with a smite.' "

In the next edition the newspaper's editor corrected the error by saying, "I doubt that those girls would ever smite you, but that's no indication that they can't, because I know of several young men about town who have been smitten by them in the past."

•

TEMPORARY EMPLOYE. During an artillery field exercise at Ft. Riley, Kan., some soldiers were stumped by the problem of stringing a telephone wire through a narrow culvert under a road.

Then Sgt. Floyd F. Walker of Miami, Fla., remembered that Pfc. Odie Williams of Chicago had caught a rabbit in the deep snow.

The wire was tied to the rabbit, which scooted through the culvert with it. As a reward, Williams released the bunny.

•

DUE CAUTION. Adams County, Ill., supervisors 76 years ago were a bit wary of that new-fangled gimmick, the telephone, according to a newspaper story published on Dec. 19, 1880.

The people of Quincy at that time petitioned the supervisors to install a telephone in the lobby of the county court house, the cost of which was to be $48 a year.

The board, opposed to the telephone, passed a resolution to install it, provided the petitioners paid half the amount.

•

SWITCH-OVER. The president of the grammar school PTA in Long Beach, N. J., recently hit a snag when she conducted a telephone poll to ask parents: "Do you know where your children are right now?"

On many of the calls, she reported, children answered who didn't know where their parents were.

•

ANCHORS AWEIGH. It took 23 firemen, policemen and ambulance drivers plus a lot of telephoning to take a Detroit woman to the hospital recently, and now the same task force is going to have to take her home again.

The woman weighs about 500 pounds and is unable to walk.

She wanted to go to the hospital on Feb. 11 for a checkup, so her doctor called an ambulance. The driver called police. They called more police plus the fire department.

The 23 men rigged up a block and tackle, pulled out a stairway bannister and deposited their charge in the ambulance.

CIRCULATION

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Since 1901

February 25, 1956

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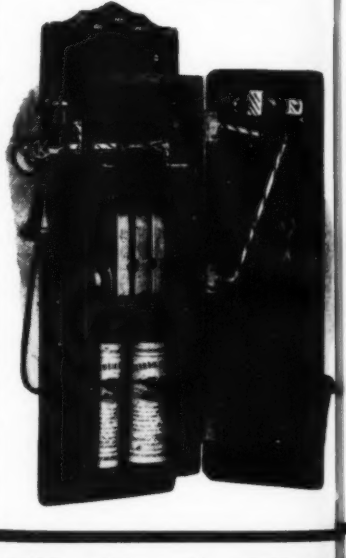

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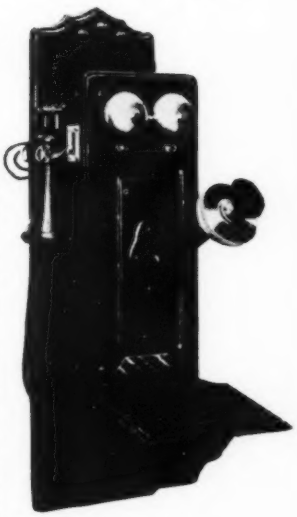

This telephone is extensively used on account of its compactness and the accessibility to all parts. It is built for either series or bridging work, and fitted with the KELLOGG TRANSMITTER as described above.

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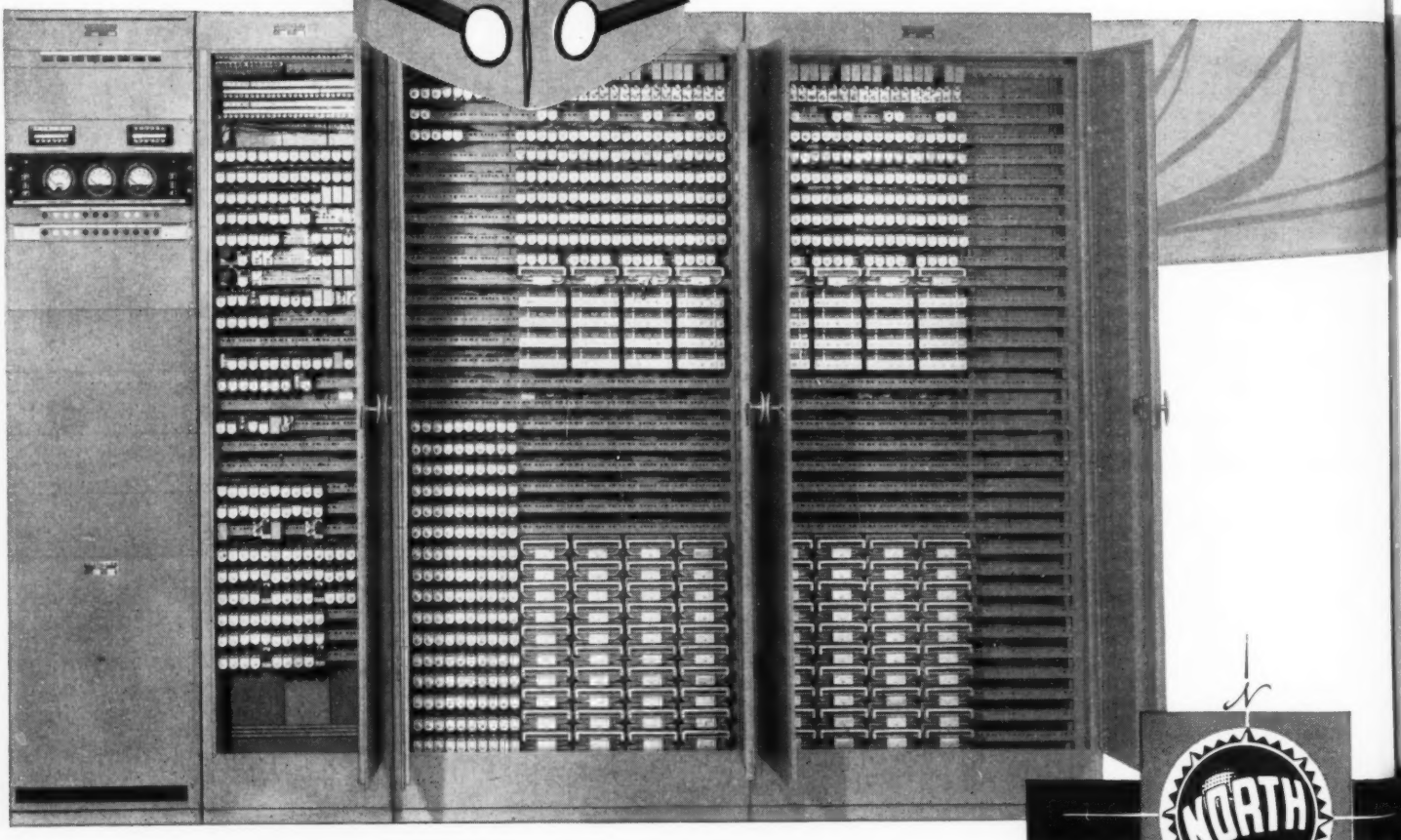

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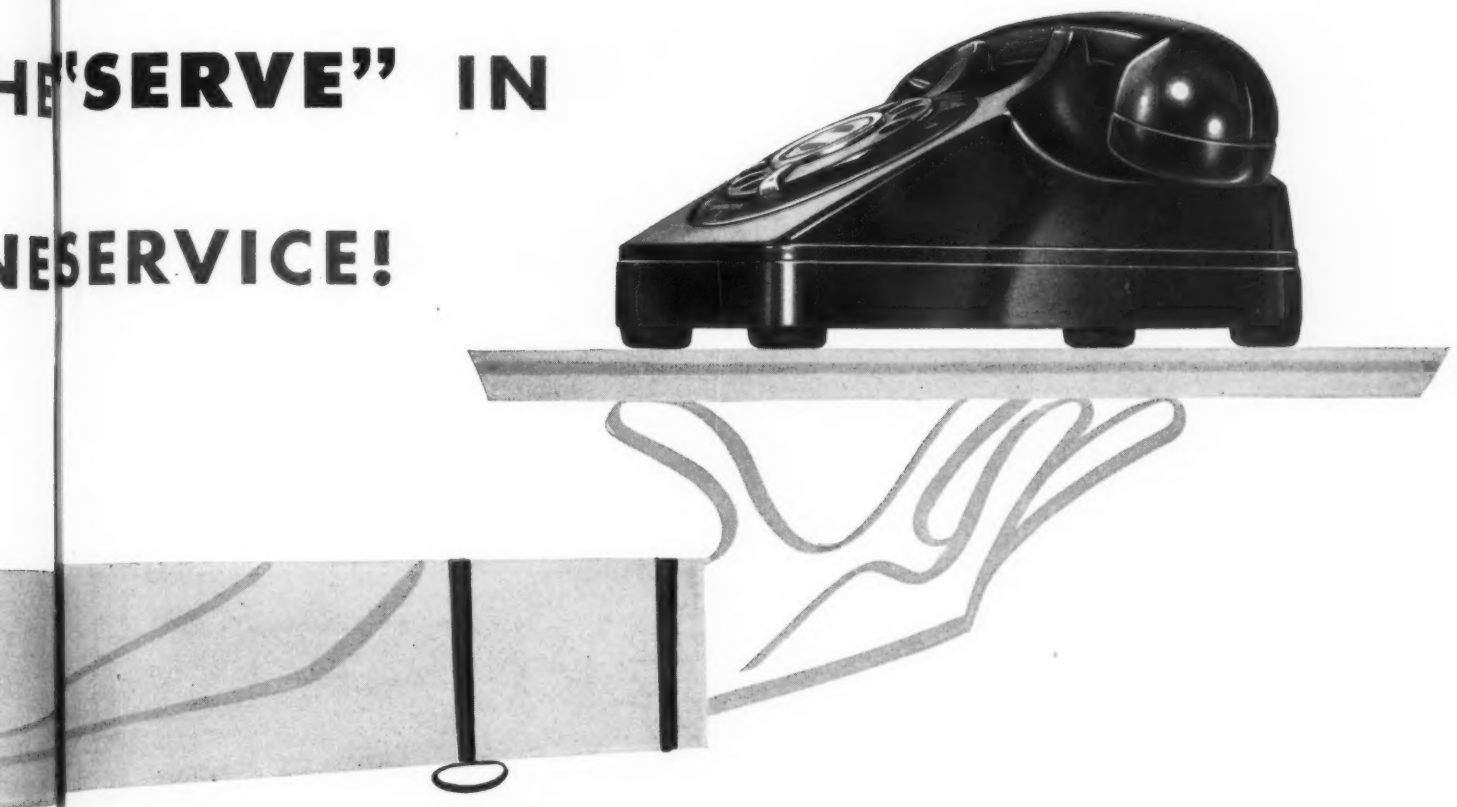

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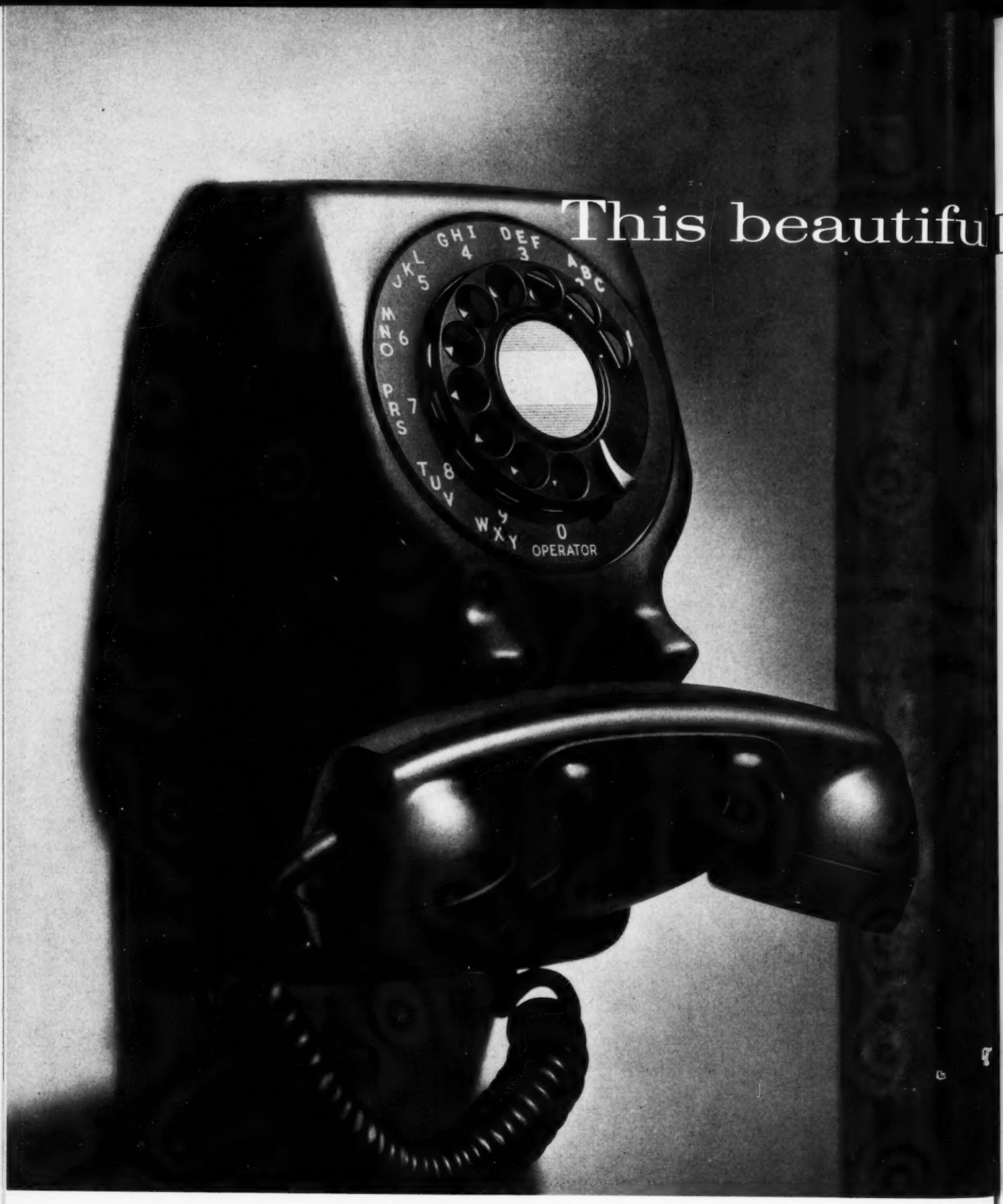

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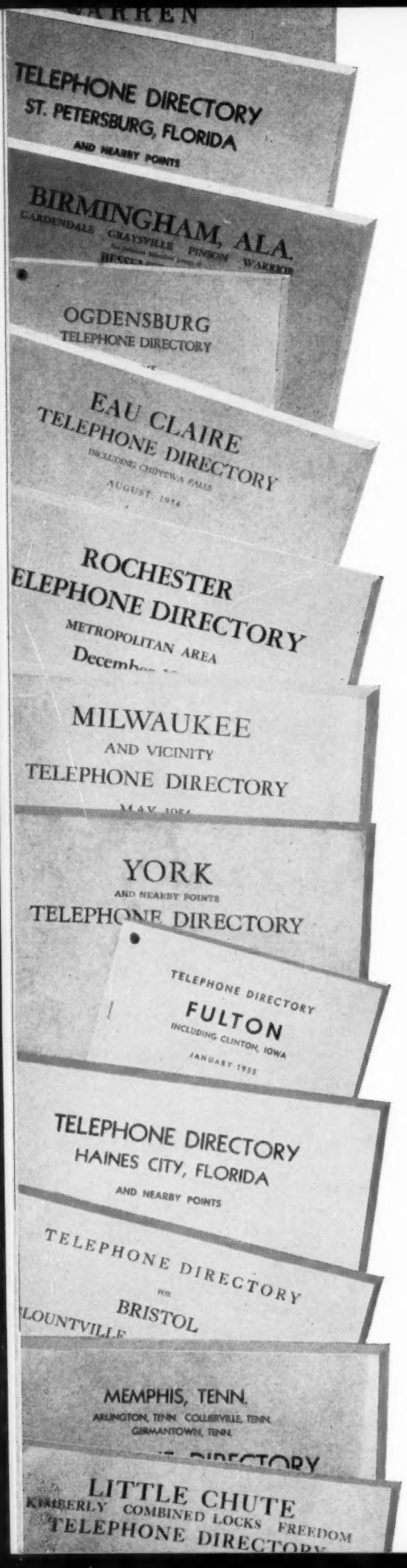

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

New York Legislature holds hearings on six bills to tighten up wire-tapping practices. FCC studies cases involving competitive microwave policies. California commission considers effect of telephone company's acquisition of mobile radio system on over-all telephone rate structure.

UP IN NEW YORK CITY on Feb. 16, at the city bar association headquarters, a joint committee of the New York Legislature held hearings on six bills designed to tighten up wire-tap practices. Testimony at these hearings included two opposite and somewhat extreme schools of thought on the ever-troublesome problem of preventing abuse and protecting proper use of wire-tapping from the standpoint of public interest and civil rights.

New York State permits wire-tapping under court order. The legislative inquiry was ordered after complaints that illegal wire-tapping in New York City had become widespread. There were charges, also, that court-ordered wire-taps were being used by government agencies for reasons other than law enforcement. The proposed bills in the legislature have attracted some opposition from law enforcement officials.

New York District Attorney Frank S. Hogan and other prosecutors in the area on the county, state, and federal level have been successful in convincing the committee that wire-tapping is a necessary tool in their business.

"We found enough, by interrogating men in the law enforcement field throughout the country, to satisfy us that wire-tapping is a weapon of prosecution that should not be taken away," said New York Assemblyman Anthony P. Savarese Jr. (Rep., Queens), chairman of the committee. He added: "We were surprised to find that in many instances wire-tapping has led to the solution of crimes. We learned that it is not only used in the prosecution of bookmakers . . . but also in major crimes."

The proposed legislation has numerous provisions which Savarese said he feels law enforcement spokesmen will attack. A demand that judges, to whom applications for wire-tapping permits are presented, receive full information on why the tap is asked, even if it is necessary to take testimony under oath, is one of them. He said the enforcement officials believe such information would make it possible to "sell out" a wire-tap plan.

Another feature that will be found objectionable, Savarese said, leaves all wire-tap equipment in the possession of the telephone company. The company has protested that such a plan will expose large batches of its employes to corruption. Police officials say the plan is impractical.

Robert Daru, city bar association president, asked Savarese to consider proposing a law under which courts would have to report every two years on the number of wire-tap applications they have granted and the results of the investigations. "We have never been able to find out exactly just how much good these wire taps do," Daru said. "Even the legislative committee, after completing a long investigation, has not been able to answer that question."

Savarese said he did not believe the courts would approve such legislation, but he said he would ask his committee to study it.

Down in Florida, a recent decision of the Florida Supreme Court (Southern Bell Telephone & Telegraph Co. *versus* Nineteen Hundred One Collins Corp.) has upheld Florida's somewhat unique law on this subject. Under Florida law, the use of customary telephone and private wire facilities for gambling purposes is unlawful. When any utility company, providing customary telephone service, is informed by any state or federal law enforcement officer that the service being provided is being used illegally, then the utility is supposed to disconnect and remove all telephone and telegraph service.

The Florida statute also provides that licenses issued by the state beverage department or the state hotel commission are automatically suspended during the time telephone service is discontinued due to illegal use. *Neither statute provides for a hearing prior to the discontinuance of telephone service or the suspension of hotel or beverage licenses.* The "anti-bookie law" does provide for a hearing before the Florida Railroad and Public Utilities Commission after the telephone service has been discontinued, which hearing is limited to the question of restoration of service.

The net effect of the two statutes is to put a hotel operator out of business without a prior hearing if he allows his telephone facilities to be utilized for gambling purposes. The party, in the test case, a hotel operator, contended that this procedure constituted a denial of due process as required by the Declaration of Rights of the Florida Constitution and the Fourteenth Amendment. A lower court agreed, holding the statutes unconstitutional.

The Supreme Court of Florida reversed this, with three judges dissenting. The high court ruled that gambling and the regulation of hotels were appropriate areas for the exercise of the state police power.

With respect to the main issue of due process, the court said that it felt that the mere privilege of going into court, prior to the actual revocation of telephone service, met the organic re-

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quirements of due process because of the nature of the regulation involved and the objectives to be accomplished. Earlier decisions had established this right of a telephone user to present his cause before a court in an effort to prevent the discontinuance of service as prescribed by statute.

An interesting distinction was made where the telephones had admittedly been used for gambling purposes and where the use of telephones for the transmission of gambling information was disputed. In the former case it was held that only "some peculiar or unusual equity" could forestall the discontinuance of telephone service, whereas in the latter any party threatened with unjustifiable discontinuance of service could show such lack of justification, with the result that a restraining order would be allowed, preventing the termination of customary telephone service.

Microwave Competition Cases

A wrong impression may have been obtained by readers of this department last week regarding the recent decision of the state of California to conduct its farm information service over Western Union facilities. It was not intended to infer that California has given up entirely on its idea of a state-operated microwave radio system handling administrative agency traffic. California's petition on this is still pending before the Federal Communications Commission (FCC). And both the Bell System and the United States Independent Telephone Association are still opposed to granting this petition.

The fact that the state is going ahead with its agriculture information service through the use of Western Union's facilities probably means that the FCC is not under pressure to make any early decision on the matter. But there are several other cases involving competitive microwave communication policy which may result in an important decision by the FCC at an earlier date than the state of California's case.

Two somewhat similar cases, now being studied by the FCC's staff, involve, respectively, applications by the Minute Maid Corp. (a frozen concentrate concern in Florida) and some trucking companies in Texas for private relay systems.

Both of these petitions are opposed by common carriers, which contend that there are adequate telephone-telegraph company facilities to meet such applicants' needs and that the FCC's policy is to favor such alternative diversion of communication traffic where feasible. Still another controversy, involving competitive communication policy, may grow out of a movement among television broadcasting organizations for authority to operate and own intercity relay systems, notwithstanding the alternative availability of telephone company facilities.

Compensatory Radio Rates

In connection with the foregoing, it has been nearly a year since the public utilities commission of the state of California ruled in favor of permitting a telephone company to lease private radio-telephone systems to the Southern Counties Gas Co. and the Southern California Gas Co. The telephone company involved was the Pacific Telephone & Telegraph Co. (9 PUR 3d 193, decided March 21, 1955).

The joint applications of the three utilities sought approval of agreements whereby the two gas companies would sell their radio-telephone equipment to the telephone company which, in turn, would lease the equipment back to the gas companies for operation, with maintenance and new facilities being supplied by the telephone company. The question arose as to whether the lease rate should be investigated to determine whether it was compensatory or would impose a burden on other customers of the telephone company.

The California commission found that the owning, leasing, and maintenance of private mobile radio-telephone systems by Pacific Telephone & Telegraph Co. would *not* interfere with its regular telephone service; that the proposed arrangement would *not* burden gas consumers, but would rather effect economies for the gas companies; but that the proposed transaction, at the agreed charges, would *not* be compensatory to the Pacific company and would, therefore, result in a burden on the regular telephone customers of Pacific company.

On the basis of this latter finding, the agreements were not approved. Permission was given to amend them so as to provide for higher compensation for Pacific. The commission held that, since Pacific did not segregate its properties, the risk of the special undertaking might fall upon its rate-payers rather than upon its stockholders. Thus, if the contract with the gas companies did not yield sufficient return, that return would have to come from the telephone customers. The commission stated:

"We conceive it to be our duty to prevent them (monopolies) from taxing their rate-payers to finance experiments.

"But we do not conceive it to be our duty or consistent with our duty, as servitors of the public welfare, to prevent them from engaging in new projects at their stockholders' risk."

This case is highly important as it represents an unusual situation wherein a state public utility commission has considered telephone company mobile radio system acquisition as it might affect over-all telephone rate structures. This field for consideration is almost certain to engage close Federal Communications Commission study in the future.

Miscellaneous

The National Association of Railroad & Utilities Commissioners (NARUC) has just announced the latest revision (as of June 30, 1955) of its Manual of Local Service Telephone Rates. The revisions cover rate changes in 14 states. They also include a section on "borrowers from Rural Electrification Administration" which shows rates for exchanges using REA funds to convert, expand, or improve service. There is also a section on 10-cent coin telephone rates.

Sets of the revised pages (32) can be obtained from the NARUC headquarters, Box 684, Washington 4, D. C., at $1.00 a set. The complete 1954 manual with the 1955 revisions can be obtained from the same place at $2.00 a copy.

•

Mar. 1, 1956, will be the deadline for increased minimum wages for all telephone company employes under the revision of the Fair Labor Standards Act, boosting the minimum hourly rate from 75 cents to $1.00. This covers all employes except those specifically included in the provision of the law exempting switchboard operators employed in exchanges having less than 750 stations. There is a penalty for any company failing to pay the higher minimum rate.

Higher minimum rates are also effective Mar. 1 for "learners." Instead of the present rate of 57½ cents for the first 320 hours and 72½ cents for the next 160 hours, the learner rate after Mar. 1 will be 80 cents for the first 240 hours and 90 cents for the next 240 hours. The so-called learning period, over-all, involves 480 working hours. Only exchanges with less than 3,000 stations can use the "learner" rates, although special circumstances may justify a somewhat higher (85-95 cents) rate in larger exchanges.

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The recent announcement by the Bell System that the present strident tone of the conventional telephone bell may eventually be replaced by a soothing clarinet tone has already revived the old vaudeville joke about "Who called that clarinet player a so-and-so?"

XUM

REA Lends $1,742,000 for Telephones in Five States

Five loans were made during the period of Feb. 5 to 11 by the Rural Electrification Administration for the purpose of improving and extending telephone service in rural areas of Kansas, Idaho, Georgia, Colorado and Iowa. In announcing the loans, the U. S. Department of Agriculture pointed out that the $1,742,000 in new long-term, low-interest loans will make possible modern dial telephone service for nearly 2,500 farm families and other rural subscribers. Details of these five loans follow:

Pioneer Telephone Association, Ulysses, Kan., on Feb. 6 was allocated $795,000, second loan. The borrower plans to use these loan funds to furnish modern dial telephone service to 1,131 subscribers in adjoining territory who were not provided for in the previous loan. This total includes 339 rural families who will receive service for the first time.

As a nucleus for this new service, the Pioneer association proposes to acquire the Border Telephone Co. exchanges at Johnson, Manter and Big Bow; the Satanta Telephone Co., and two small subscriber-owned lines. These facilities are now furnishing magneto and dial service to 611 subscribers and 181 switchers over 313 miles of line.

The association proposes to add 332 miles of new line. It will use 47 miles of the existing line in the expanded system, rebuild 149 miles, and retire the remainder. The present automatic facilities at Manter will be enlarged and new automatic facilities will be installed at Big Bow, Johnson, Satanta and northwest of Satanta. Funds also are included in this loan to add headquarters and garage facilities to the existing central office building at Ulysses. This portion of the Pioneer Telephone system, complete, will consist of 528 miles of line in Grant, Haskell and Stanton counties in Kansas, and in Baca County, Colo.

The two REA loans to Pioneer, totaling $1,653,000, will make possible new and improved service to 2,713 subscribers over 1,172 miles of line in southwestern Kansas and southeastern Colorado. Automatic central offices will be located at Moscow, Richfield, Rolla and Ulysses in addition to the five new ones listed above.

Earl B. Williams is president and Joseph B. Chilen is manager of the Pioneer cooperative.

*

Project Mutual Telephone Cooperative Association, Rupert, Idaho, on Feb. 6 was given an allocation of $455,000, second loan.

The borrower plans to use these loan funds to finance the construction of facilities to serve 763 additional rural subscribers not included in the previous loan. This increase in subscribers is due largely to the rapid establishment of homes in the irrigation district within the service area.

The Project Mutual association proposes to add 258 miles of new line over that provided in the first loan, and to purchase a site and install automatic facilities in Norland, to handle the additional rural subscribers.

With the two REA loans, totaling $1,216,000, the borrower will be able to offer new and improved service to 3,230 subscribers in Cassia and Minidoka counties. The completed system will consist of 487 miles of line, and automatic central offices at Norland, Paul and Rupert. At present the borrower is planning service without toll charge among all three exchanges as well as with the towns of Burley and Declo.

William J. Hensheid is president and Donald Dickson is manager of the Project Mutual cooperative.

*

Ellijay (Ga.) Telephone Co., on Feb. 6 was extended a loan of $46,000, second loan.

The borrower plans to use this loan to construct a new building in Ellijay to house both the central office equipment and headquarters facilities.

The company received an REA loan of $224,000 in August 1954, with which it proposes to furnish new and improved telephone service to 677 subscribers over 107 miles of line in Gilmer County.

S. B. Green is president and manager of the Ellijay Telephone Co.

*

Eastern Slope Rural Telephone Association, Limon, Colo., on Feb. 10 was extended a loan of $293,000, second loan.

In order to extend its dial service in Douglas and Elbert Counties, the cooperative has acquired the Cherry Creek Telephone Co. at Parker, the Kiowa Telephone Exchange, and the Elbert Mutual Telephone Association. These systems serve 273 subscribers and 41 switchers over 238 miles of line. It proposes to use these loan funds to finance this acquisition and to rehabilitate and integrate these facilities into the Eastern Slope system.

Of the existing line, 182 miles will be rebuilt and the remainder retired. In addition, 195 miles of new line will be added. New automatic central offices also will be constructed at Elbert, Kiowa and Parker. These changes will enable the Eastern Slope association to offer improved service to the existing subscribers and initial service to 167 rural families in the area.

The two REA loans, totaling $630,000, will make possible modern telephone service to 914 rural subscribers in Douglas, Elbert, Lincoln and Washington counties. Automatic central offices will be at Arriba and Genoa in addition to the three new ones in the Feb. 10 loan.

J. D. Curtis is president of the Eastern Slope Rural Telephone Association.

*

Griswold (Iowa) Cooperative Telephone Co., on Feb. 10 was allocated $153,000, third loan.

The borrower plans to use these loan funds to improve and extend rural telephone service in an area of Cass County not included in previous loans. Present plans include facilities now operated in and around Lewis by the Western Light & Power Co. The Lewis exchange is now serving 151 subscribers over 2 miles of line, and providing switching service to 148 farm families who own 68 miles of line.

The cooperative proposes to construct a new automatic central office at Lewis, add four miles of new line, rebuild about 68 miles, and use one mile of the existing line in the expanded system. These changes will make possible service for the first time to 41 rural families as well as improved service for the existing subscribers.

(Please turn to page 44)

XUM

Fig. 1

Fig. 2

Fig. 3

POWER for small T

Fig. 13

By John R. Fox*

PERHAPS the title of this article should be—"How Can Small Companies Construct and Maintain Outside Plant Economically?" I would like to tell you how we do our construction and maintenance at surprisingly small costs.

In the fall of 1953, we had a mile of additional line to construct for a few subscribers who had no telephone service, but had applied for it. The summer had been very dry which made the ground dry and hard. After attempting to dig holes with hand diggers, we were forced to stop because of the length of time it took to dig just two holes.

I went back to town and talked with our International Harvester dealer, whom I knew pretty well, about a digger that could perform this operation. Upon looking through his catalog, we came across one that struck my liking to a tee. Inasmuch as neither the International dealer nor I had ever seen a digger of this particular type work, we agreed that if I would buy the digger on trial, he would loan me a tractor to operate it. The next morning we telephoned the digger manufacturer to rush one out as fast as he could. In two or three days the digger arrived, and we proceeded to mount it on an International Super C tractor.

I took two men who worked for me on a part-time basis and we loaded up some poles on a small two-wheel trailer, and proceeded to dig some holes. Much to our surprise, the digger got right down to business and we set the mile of poles that day, even though we had to learn how to operate and adjust the digger. The digger can dig a hole about 14 inches in diameter by 5 feet deep.

After completion of that mile of line, we had time for other construction and repair work.

The next spring we had our work laid out for an automatic conversion program which meant the replacement of a lot of poles and construction of additional lines. Back to the tractor dealer I went, and told him I had to have a tractor for my digger. It was then that I purchased a tractor of my own through this dealer. We gave the digger and tractor a real workout during the Summer of 1954.

The next spring we decided to make our work a little easier by adding a hydraulic loader to the tractor with a derrick on front for handling poles and other jobs.

The different jobs performed with this equipment can best be explained, I believe, by the accompanying illustrations that were taken while work was being done:

Fig. 1. The digger starting a hole for a 25-foot pole.

Fig. 2. The digger is down 3½ feet and still going strong.

Fig. 3. Taking a pole off the truck with the use of the derrick on the loader.

Fig. 4. Swinging the pole to line it up for placing.

Fig. 5. The pole approaching the hole.

*Mr. Fox is the progressive owner of the Waldron (Mich.) Telephone Co., and he recently converted his system to automatic operation. He also is a director of the Michigan Independent Telephone Association.

Fig. 7

Fig. 8

Fig. 9

XUM

Fig. 4

Fig. 5

Fig. 6

Telephone Companies

Fig. 6. Letting the pole down in the hole.

Fig. 7. Straightening the pole in the hole for tamping.

You might say that, with this method, digging holes and setting poles is an easy job and you would be so right, for as you know, hand digging requires a lot of work as well as time —and setting a 25-foot pole is no snap when you have to strain and push to up-end it in a hole.

There are many more jobs that can be done with the tractor and derrick to make work easier, and to save time. Let's take a look at a few more illustrations.

Fig. 8. A man stands on a bar of the derrick to make a test, to make a repair, to replace a bracket, or even to tie in a line as you can see in Figs. 9 and 10.

We even pull in line wire with the tractor, and after pulling the wire up to the proper tension, we go right down the road from pole to pole and tie in as you see in Fig. 9.

Let's take another job that is always difficult and one which no one likes to do—moving brush. To accomplish this job we secured a grapple hay fork and placed it on the hook of the derrick. The following illustrations show this operation:

Fig. 11. Sticking the grapple fork in a brush pile in preparation for moving it to an open space for burning.

Fig. 12. Lifting the brush.

Fig. 13. Piling the brush.

There are many jobs that can be done with a set-up such as ours, thereby facilitating construction work and repairs.

Now, for some cost figures we obtained using this type of equipment.

Let's take the digging of pole holes as an example. On the average, it takes about three to four minutes to dig a hole of say 4 feet and 14 inches in diameter. Now mind you, I said an average. There are some places where you can dig more easily because of the softness of the ground. There is good, old, hard clay ground in which it has taken as long as eight to nine minutes to dig a hole.

Let's figure this in time and labor saving. If you have to dig a hole in hard clay by hand, two men will do it in approximately two hours. Now, take the wages of these two men, which in my case, is $2.00 an hour. What are the results?

Two men at two hours each equals four man-hours, which at $2.00 per man-hour equals $8.00. Let's see what the power digger will do the same job for. We will say it takes 10 minutes to dig the same hole by power.

Two men at 10 minutes each equals 20 man-minutes, or one-third of an hour. At the same wages it would amount to $1.33, or a saving of $6.67. Now, if you split the difference on the tractor and digger, what are the results? As I see it, the machinery can pay for itself, and you save aches and pains and don't go home at night all tired out, trying to pick a fight with the dear wife who had no hand in digging the hole! Just sit down some rainy day and figure the savings on other jobs you could do with this kind of power in your own company. It will surprise you. Your community will see the rapid progress you are making, and I am sure you will have a much better plant with a lot less effort and strain.

Incidentally, we have found a unique way to help us pay for the power equipment we have described. In our slack periods we hire out a man and our tractor and digger to farmers for digging holes for silo pits, bull pens, fence posts and pole barn construction. You would be surprised at the amount of income that can be drived from this source.

Fig. 10

Fig. 11

Fig. 12

XUM

RADAR *enters the telephone field*

By HAROLD B. McKAY

PART 3

THE ELECTRON tube circuits used in radar and in the Line Fault Analyzers are somewhat different than those used in radio sets. While tubes behave much the same way, the application can be different. Probably, most telephone men are unfamiliar with these applications; so a short introduction to this kind of circuitry will be given here.

A Line Fault Analyzer has the following principle circuits: Trigger Generator, Marker and Delay Generator, Pulse Generator, and Sweep Generator. In addition there are power supplies for the regular tubes and a high voltage supply for the cathode ray tube. While radar is a complicated assembly as a whole, each of the parts, when viewed separately, is quite simple.

Trigger Generator

This kind of equipment requires sort of a master pulsing device which can trigger or set off the other circuits. It is a simple circuit using a gas tube (rather than a vacuum tube). These tubes are sometimes called thyratrons. They differ from a regular vacuum tube in that when they are ready to conduct electricity, they do it in a hurry. A vacuum tube changes current gradually as applied voltages change.

The thyratron "fires" when the applied voltage reaches a critical value and conducts all at once. The trigger generator in *Fig. 3.1* works this way. When the ac, which is applied to the plate, goes positive, it charges up condenser C2. It also puts a voltage on the grid, subject to a delay caused by the charging of condenser C1. When the condensers are charged enough, voltage appears on the grid to trigger or fire the tube. It suddenly conducts from cathode to plate.

Take condenser C2 to be the source of current as it now discharges. The discharge goes through resistors R2 and R1 and the tube, all in series. The voltage drop on the resistors results in a positive condition at the top of R1 and a negative at the top of R2.

Once the condenser discharges, it starts to charge again; and the whole process repeats. Because of the sudden firing of the thyratron tube and the sudden discharge of the condenser C2, the plus and minus voltages at the resistors are actually short pulses of voltage coming at the rate of 60 times per second because it is fed by 60-cycle ac. (In actual practice, two tubes are used to give 120 pulses per second.)

Look now at the simplified schematic of the Marker R and Delay Generator. As mentioned earlier, this operates in a similar manner to the Sweep Generator.

The Marker Generator is a type of oscillator or "flip-flop" circuit which is stable in one condition. That is, when in the stable condition, it will not oscillate. This stable condition occurs when tube V3 is conducting as it is normally. When V3 is conducting through its electrons, a voltage drop occurs across the resistors connected to its cathode.

But, notice that the cathode of V2 is also connected to these resistors. This results in the voltage across the resistors, appearing on the cathode of V2. This voltage is high enough in relation to the grid of V2 to prevent this tube from conducting. It is in the "cut-off" condition.

When a negative pulse occurs at R2, it is transmitted through C3 and C4 to the grid of V3. This grid was formerly positive because of its connection with the plus supply above. When the grid changes to negative, V3 stops conducting. When it stops, the voltage drop on the cathode resistors disappears. This removes the voltage from the cathode of V2. The grid of V2 is now in proper voltage relation to permit the tube to conduct, which it now does.

Later, the charge on C4 which came from the trigger generator leaks off through R4, the grid of V3 becomes positive again, V3 conducts, V2 stops conducting, and the circuit is stable again.

This "one-shot" on-and-off effect causes the cathode voltage to change in a square or rectangular manner. That is, the cathode resistors either have full voltage or no voltage across them with nothing in between. This rectangular wave has a positive (upward) pulse at its end. By changing the value of R3 and C4, the length of the rectangular wave can be changed, and the end pulse can be delayed.

In the analyzer, changing these factors results in changing the mileage range of the instrument. The controls on the front of the set adjust the resistors and condensers in this circuit. The resulting delayed "end pulse," instead of the original trigger pulse, is fed into the Sweep Generator which in turn moves the beam in the cathode ray tube.

In *Fig. 3.1* the switch in position "A" feeds the direct trigger pulse into the sweep circuit. In position "B," the delayed "end pulse" is used.

The wave shade of the original trigger pulse, and the rectangular wave with the "end pulse" are both shown in the drawing in the parts of the circuit where they are generated.

Pulse Generator

The pulse that goes out on the line comes from tubes V4 and V5 in the pulse generator. Between pulses the power supply charges condenser C6. When a positive pulse is received from the trigger generator, V4 conducts, causing a voltage drop across R9.

V4 is connected in what is called a "cathode-follower" arrangement. This is often used in electronics much as a transformer would be.

In this case, the voltage in the trigger circuit is high. The voltage going to the grid of V5 is lower. It is determined by the value of the resistor R9. Thus a vacuum tube is made to serve the purpose of a transformer and at less cost.

When the voltage is applied to the grid of V5, this thyratron conducts. This permits the condenser C6 to discharge rapidly into the line. It gives a 1,000-volt pulse for one-millionth of a second. The discharge path is from the left plate of the condenser, through the tube to the line and back again to the other plate of the condenser.

When the pulse is finished, the voltage surge has been sent out on the line and bounces back or echoes from any defect. When it comes back, it goes through resistor R5 and up into the vertical deflection plates of the cathode ray tube.

If an open exists on the line, the returning pulse will be of a polarity to cause the beam to deflect upward, causing a pip in the horizontal line on the tube. A short would cause a downward pip.

The resistor R6 is made of thyrite, a material which was described in an article entitled "Varistors, Thermistors and Crystals" in the July 16, 1955, issue of TELEPHONY. This material greatly lowers its resistance when the voltage across it is raised. In this circuit the outgoing pulse of 1,000 volts appears across R5 and R6. If these were ordinary resistors, the voltage going up to the cathode ray tube would be too much.

Instead, the thyrite lowers in resistance and practically grounds out the lead going to the tube. As a result, less than half of this voltage surge gets to the deflection plates. R5 prevents this grounding out effect from reducing the voltage impressed upon the line.

On the return pulse, which may be less than 100 volts in value, the thyrite remains in its high resistance condition. This permits about 95 per cent of the return voltage to reach the cathode ray tube.

The 1,000-volt pulse is a higher voltage than ordinarily used in the telephone business; but because of its low current and its short duration of one-

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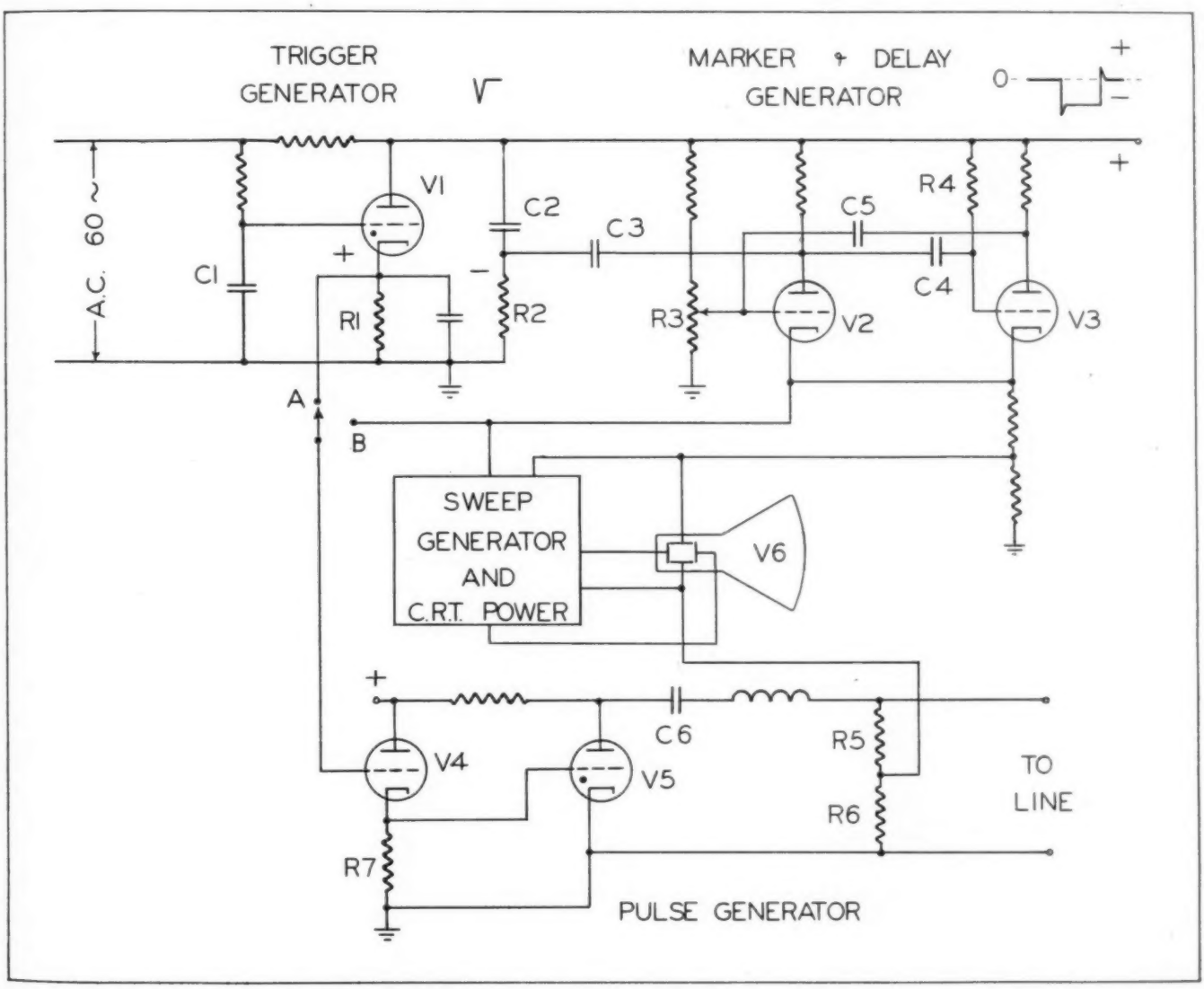

Fig. 3.1. This is a simplified schematic for a fault locating radar. The trigger circuit generates a pulse which is shaped and timed by the marker and delay equipment. The trigger also sends a pulse to the pulse generator which produces a high voltage surge by the discharge of condenser C4. The returning echo pulse from the line is applied to the vertical deflection plates of the cathode ray tube. Time elapsed between original pulse and returned echo determines distance to fault.

TROUBLE CLEARING

What Have Angles To Do With Electricity?

BY L. N. MARTIN

THE STORY is told around telephone offices of the "Oldtimer" who said: "I used to be a switchboard man but when they got that third wire (the sleeve) it was too much for me." The young man who seeks to educate himself in the technical end of telephone work often comes to a stumbling block—or shall we say a stone wall—which stops his progress.

We have seen many men grasp the theory of direct current quite readily but when they began the study of alternating current (and most telephone currents are alternating) they encounter such expressions as: "Angle of phase shift"; "30° lag"; etc. They know what an angle is but it does not fit into their mental picture of electricity.

This article is an attempt to clarify that point for the beginner; but the engineer need not skip this one as it may possibly give him some hints in teaching this subject to some ambitious student.

Circular measure is used for measuring arcs, i.e., parts of circles. The unit is the degree which is 1/360 of a circle. In other words, there are 360 degrees in a circle. If fractional units are required, the degree is divided into 60 minutes and the minute into 60 seconds. The following abbreviations are in common use: ° for degree; ′ for minute, and ″ for second.

The same system is used for measuring angles and, hence, is often called "angular measure." We will show that it can also be used for measuring time and that it is often so used in electrical work.

Fig. 1 represents a circular dial with two hands or pointers M and N. M is stationary and always points to the right at position A which is also marked O°. N revolves in a counter-clockwise direction as indicated by the arrow. It starts at position A, and in the drawing it has reached position B which is one-eighth of the distance around the circle. The dotted lines terminating at C,D,E,F,G, and H indicate later positions of the moving line, N.

PART 47. The preceding article in this series appeared in the Jan. 14 issue, p. 24.

When N leaves position A, an angle is formed whose sides are M and N and whose vertex is O. This angle grows larger as N continues its counter-clockwise motion.

Since, in traveling from A to B, the line N has traversed one-eighth of the circle and, since there are 360° in the complete circle, the line has passed through 45° and the point B is so marked. Now notice that the 45° indicates two things: It measures the arc AB and it measures the angle AOB. Thus, it is both circular measure and angular measure. The 45° angle is a familiar one to all mechanics.

When N reaches point C it has traversed one-fourth of the circle or 90°; therefore, the arc AB is 90° and the angle AOC is 90°. A 90° angle is called a right angle. Angles less than 90° form a more or less sharp point and, hence, are called acute angles. We have also indicated 135° at D.

At point E, the line N has traversed half the circle, or 180°. The arc ABCDE is called a semi-circle. N is now lined up with M so that the two form a straight line. This would not ordinarily be called an angle but for

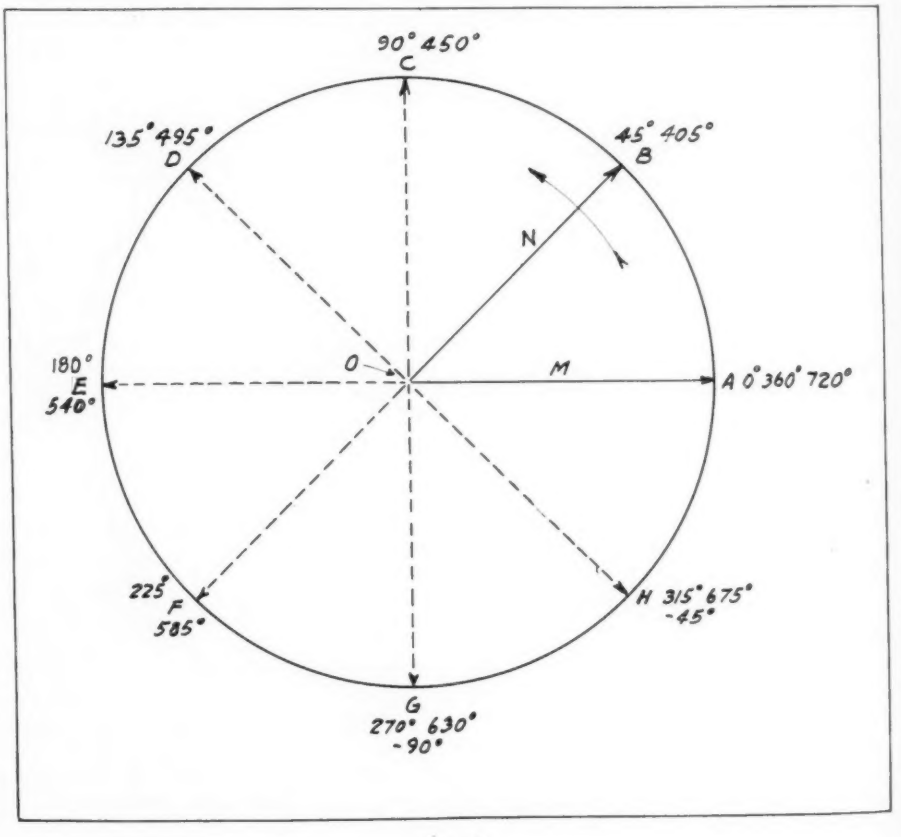

Fig. 1

some purposes it is considered an angle and is called a straight angle. Angles between 90° and 180° form a blunt point and hence are called obtuse angles.

The line N moves on and in the drawing we have noted 225°, 270°, and 315°. Angles between 180° and 360° do not form a point as the two sides are bent backward towards each other, hence, these angles are sometimes called reflex angles.

At last, the moving line reaches its starting point, A or O°. However, it has traveled around a complete circle, or 360°, therefore, point A is also marked 360°. This is the end of the first cycle.

However, the line need not stop here. If it moves on to point B it will have traversed 360°, plus 45°, or a total of 405°, as indicated by the second figure at B. Likewise, at each of the other stations we have indicated the number of degrees on the second trip around. The end of the second cycle at A is 720°. A motor operating at 1,800 rpm will generate a very large angle in a short time; to be exact, it will generate 648,000° in one minute or 38,880,000° in an hour.

For certain computations, angles greater than 360° are useful but when drawn on paper 405° or 765° look just the same as 45°. To simplify an angle greater than 360°, divide the angle by 360 and the remainder will be the simplified angle. Example: What is the meaning of an angle of 2,190°? Answer: 2,190° divided by 360 gives us 6 with 30° remainder. Therefore an angle of 2,190° is for most purposes just an angle of 30°.

The line N may travel backward (clockwise) as well as forward. If it starts at A and moves to H it has traveled only 45°. To distinguish this from the 45° at B, this is called an angle of —45° or a negative angle of 45°. A negative angle looks just like a positive angle of the same magnitude but, for some calculations, it is important to distinguish between positive and negative angles.

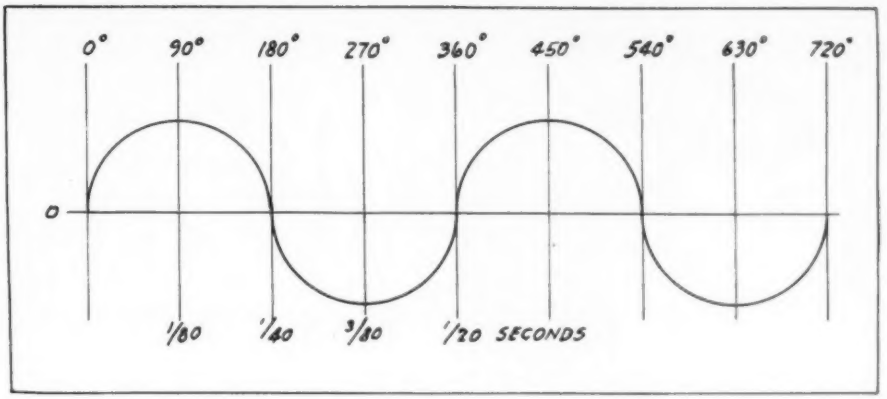

Fig. 2

Now, let us see how our circle and moving line can be related to time measurement. Any movement involves time. Suppose that line N is moving at a uniform rate that will take it completely around the circle in eight seconds. Obviously, it will reach B in one second, C in two seconds, etc. How long will it take it to reach 60°? We divide (8 seconds x 60) by 360 which gives us 1⅓ seconds. Where will the line be at the end of 4½ seconds? 360°÷8 X 4½=202°30′. Thus, *if the speed is known*, the position of line N can be described in units of time as well as in units of circular measure.

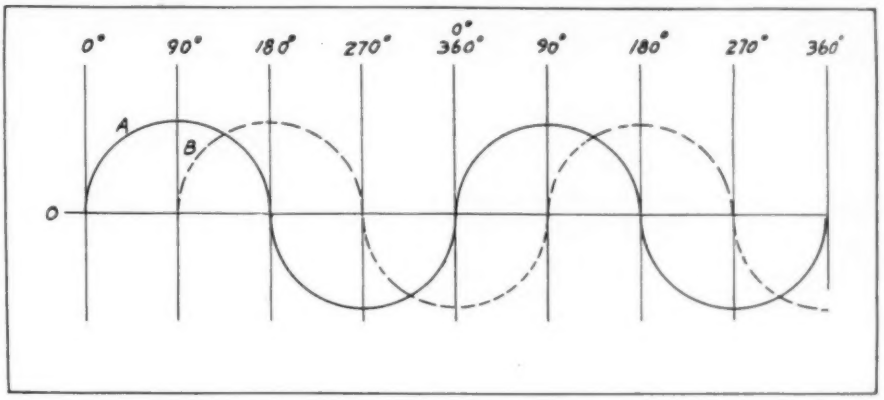

Fig. 3

The word "cycle" is closely related to the word "circle." Without going into the finer shades of meaning which the dictionary might give us, we can say that "cycle" means a chain of events that finally comes back to the starting point and then repeats in the same order. Each time it returns to the starting point and is ready to start out again, another cycle is completed.

Thus, if we start the year on the first day of spring (as was once the custom) we have in succession: spring, summer, autumn, and winter; then the first day of spring comes again and one cycle of seasons has been completed.

A four-cycle gasoline engine is so called because it requires four steps (piston strokes) to complete one cycle of operation. The strokes are: Intake, Compression, Power, and Exhaust. Then the next stroke is Intake which starts the second cycle.

In *Fig. 2* the wavy line is the usual symbol for an alternating current, or an alternating voltage. The horizontal line marked O indicates that at the instant the curve crosses that line the voltage (or current) is zero. The

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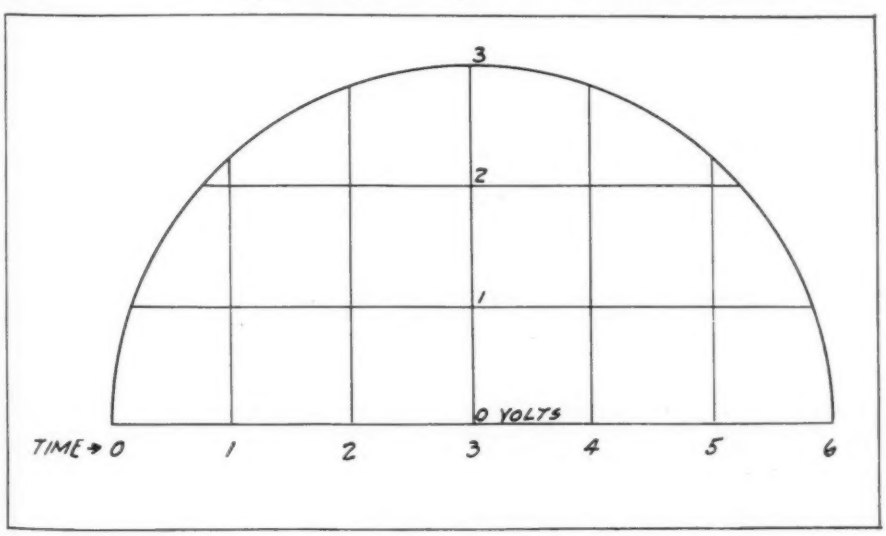

Fig. 4

today's Highlights

of finance-taxes-business trends

by Willard F. Stanley

CAPITAL COSTS: Both long and short-term money rates have been marking time for the last month. The mild improvement in long-term bond rates which we thought might follow the Ford stock closing hasn't yet substantially materialized, although rates have been better than steady. The Wall Street Journal's new issue list of nine utility bond issues shows an average decrease in per annum yield of approximately .07 per cent, based on the average bids at Feb. 14 versus the original offering prices of these issues. Treasury bill rates have shifted a little recently but have generally remained within normal limits of movement.

The line of least resistance for the near future still seems to indicate desirability of proceeding with any senior security financing where the money is expected to be needed in the not-distant future. And this is doubly true of projected common stock offerings, where price-earning ratios and yields still seem highly advantageous. Here, as before, we would be inclined to raise future equity money requirements needed within the next year, or even more. General agreement with the above recommendations comes from Stone & Webster Securities Corp., a leading underwriter of public utility securities.

* * * *

SPECIAL AND EXTRA: A new and interesting recent development in the field of finance is offering to stockholders of a small utility the right to exchange their common stock into the same number of shares of a new class of common stock, equal in rights to the present common in all respects except that the new stock would be entitled to dividends payable solely in stock of the same class, while the present common stock would continue to receive dividends payable solely in cash. Dividends would be declared and paid in equal amounts, simultaneously on both classes. We are now engaged in preparing articles on this subject and will have more to say about it in next month's colmun.

* * * *

TIRED STOCKS: A rise in stock averages after the Ford stock closing on Jan. 26 developed, as we predicted, but lasted only about 10 days, when it was succeeded by the downward trend prevailing throughought most of January. Declines seem to relate to statements about the disclosure of the President's intentions to run

Mr. Stanley, formerly financial vice president of Southwestern Public Service Co., an electric utility with over 160 million dollars in assets, is president of Corporate Services, Inc. of New York City. He is a member of Controllers Institute of America and New York Society of Security Analysts. He serves on three committees of the Controllers Institute having to do with federal taxation, social security and finance management. His articles are appearing once a month in TELEPHONY.

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Raytheon KTR-100 series (100 mw RF output) TV microwave links provide reliable, high quality transmission of video and audio at lowest cost. When you need additional power to overcome "grazing" conditions or for longer hops, the extra 10 db power output of the KTR-1000 series (one watt RF output) meets your requirements.

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again. Stocks seem jaded, as if needing some new stimulus, such as the President's announcement that he will run. This seems a sore subject, reference to which in the press, usually has been followed by stock liquidation, touched off by the fears of the investing public. It is hoped that the matter of succession can be tabled until the President announces his definite decision, which—it is hoped—will be in the affirmative, in the interest of the nation, and, we hope, his own, also.

This uncertainty of the future and the good results from the past are working at cross purposes in the market, which brings to mind a recent luncheon argument as to who was better known between Frank (Bring-them-back-alive) Buck, and Gene Buck, who used to write the books and lyrics of the Ziegfield Follies. Upon asking the waitress what the word "Buck" suggested to her, she replied unhesitatingly "a dollar."

The 50-stock New York Times average stood about 4 per cent below the Dec. 31, 1955 level in Feb., compared with a decline from the same mark of about 6 per cent to Jan. 19. So, in the intervening month, stocks first slipped a little, then rose moderately and then fell back to a little below where they had been at the earlier date, perking up recently on the doctors' favorable report of Ike's condition.

* * * *

SMALL COMPANY LOAN PLAN: The loan plan for small telephone companies sponsored by Northwestern Mutual Life Insurance Co. of Milwaukee and so ably described by Mr. Reno in TELEPHONY's Jan. 28, 1956, issue, should fill a long-felt need for the small Independent telephone companies desiring to convert to automatic operation, or otherwise modernize plant, or fund existing bank loans. It seems a comprehensive and yet simple procedure, whereby the small telephone system can expeditiously raise long-term funds at reasonable interest and minimum expense.

We would like to reiterate the suggestion of Mr. Thornborrow of the insurance company that companies wishing to borrow under the new standard contract program first contact the secretary of their state telephone association. Information obtainable from the state associations should help to expedite the loans. Also the state associations will be advised of the accountants which the insurance company has approved to certify the statements of the borrowing companies.

* * * *

CHANGE IN TAX ACCOUNTING: Since enactment of the 1954 Revenue Code, many taxpayers have requested permission to change their method of accounting for Federal income tax purposes, such changes involving billing and inventory methods as between cash and accrual bases. To date the Treasury Department has not acted on any of these applications, leaving these taxpayers in uncertainty as to their tax liabilities. Some of these applications were filed over a year ago. The department has now officially announced that these applications will be acted upon as soon as pertinent regulations are promulgated.

It also appears the department will allow the change to be effective for the year for which the application was made. We understand now that the regulations may be expected in the summer. It may be wise for taxpayers who have filed such applications to ask for an extension of time to file their 1955 returns, and thus avoid the necessity of filing an amended return if the change applied for is granted later this year.

In view of the delay, taxpayers may wish to compare their tax liability for 1954 and 1955 under their present accounting methods, with the liabilities which would result if their applications were granted, so that any material increase in such liability may be properly reflected in their accounts.

XUM

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITOR

WE HAVE RECEIVED reports that during the recent heavy rains in certain parts of the West several central offices were flooded. Some of the newer offices do not have a basement and an outside manhole cover is used to enter the cable vault. These vaults were flooded by way of the manhole; thereafter the water rose into the first floor of the buildings. In some cases, too, it is understood that water entered through low windows on the first floor.

We certainly hope that there will never be another flood of this nature. Just to make certain though that equipment damage will not recur, some of the affected companies are preparing to build water-proof bunkers around the cable vault manhole openings and in a few cases around the low windows of the building's first floor. We believe that this will undoubtedly prove cheap insurance against flood damage.

•

While visiting the West Coast recently we noted a clever arrangement being practiced by the Pacific Telephone & Telegraph Co. to make use of their old style—and usually considered obsolete—handset telephones. This was the type equipped with a separate bell box that was popular before the combination desk set came into common use.

These old handsets have been refinished in a pleasing gold color. We could not determine whether this was baked enamel or some special type of paint finish, but it certainly presented a most attractive appearance. The handset was ivory color as was also the bell box. The retractable cord was likewise ivory color and the finger wheel of the dial was clear plastic, probably lucite.

This telephone is known as the "Imperial" and certainly is a thing of beauty. It is understood that they are carried by installers and when a new subscriber sees one alongside the conventional black set, the subscriber generally prefers the fancy number even at an increase in cost. In our opinion, this is clever merchandising.

•

The observation gallery at the National Airport in Washington, D. C., is equipped with slot machines and by inserting a dime one can hear the control tower talking to pilots through a loudspeaker. This is an interesting novelty and from all indications produces good earnings from a by-product.

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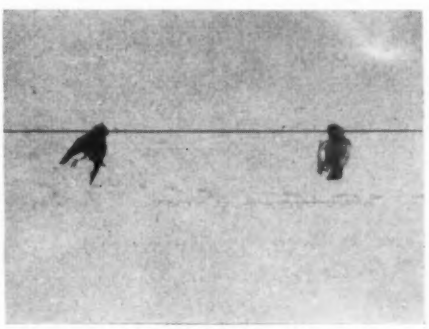
The accompanying photograph of two starlings hanged by the neck between two line wires was sent to us by W. O. Cooley, plant engineer of the Harrisonburg (Va.) Telephone Co.

It is assumed that a large number



of these birds perched on one of the line wires. Then all but two took off suddenly and the wires swung and wrapped in such a manner as to catch the remaining ones by the neck.

This unusual picture was taken by Allen Souder, installer of the same company.

•

We have a letter from I. S. Babcock, switchboard traffic engineer of the Southern New England Telephone Co., in which he makes the following comment with reference to the use of tarpaulins in the old days to protect manual switchboards:

"Tarpaulins were standard equipment in our area and I cursed them for years because of their appearance and dirt-collecting qualities. The only good we could see in them was when they were replaced they were in great demand for covering boats hauled out for the winter season.

"However, there was a case along in the middle forties which I guess paid off for the dozens which were never used.

"Our Canaan, Conn., office had three local and nine #10 toll positions and was located on the first floor of an office building. One day, a painter working on the second floor, directly over our switchboard, used a wash bowl for a step ladder and snapped the whole works off the wall.

"Our chief operator pulled the tarpaulin in a hurry and operated under it for about an hour until the flood was stopped. There was no damage to our equipment but there is little doubt that the entire switchboard would have been out of service except for the tarpaulin.

"Our last manual office was converted to dial in November 1953, and with it went the last of our tarpaulins."

This is the first case to come to our attention in which the tarpaulin actually saved a switchboard. However, it is possible that there are others and if you know of such a case, will you please tell us about it?

•

The new 625-mile military oil pipeline running from Haines to Fairbanks in Alaska was placed temporarily out of commission during the recent severe winter weather. Unofficial reports indicate that the pipeline trouble was caused by water collecting in low points and freezing.

Strange as it may seem, the communication facilities that parallel the pipeline continued to function despite the severe winter weather. This communication is partly via underground cable and the remainder over aerial open wire lines.

•

It has been said that poverty is not a disgrace, but that's about all it has in its favor.

XUM

Courts and Commissions

Minnesota Independent Gains 5.97% Return

A rate of return of 5.97 per cent on original cost of plant was authorized by the Minnesota Railroad & Warehouse Commission on Feb. 10 for the Pioneer Northern Telephone Co., Aitkin.

The company secured an increase in operating revenues from $168,872 to $184,137, which should raise net income correspondingly from $28,770 to $30,269. Plant original cost is $507,000.

The Pioneer company serves approximately 2,002 local and 565 rural stations and switches 576 stations.

Following are the old and the new gross rates:

	*Old**	*New**
Business:		
One-party	$6.00	$7.05
Two-party	5.00	6.05
Rural—common battery	4.00	4.50
Rural—magneto	3.75	4.25
Residence:		
One-party	3.75	4.15
Two-party	3.25	3.65
Four-party—code ringing	2.50	2.80
Four-party—selective ringing	2.75	3.05
Four-party—sp. area—Crosby & Deerwood	3.25	3.55
Rural—common battery	3.50	3.75
Rural—magneto	3.25	3.50

*A discount of 25 cents is allowed if paid on or before the 15th day following date of bill.

Five Kan. Companies Request Raises to Cover Wages

Five Kansas telephone companies are seeking increased rates stemming from the $1.00-an-hour minimum wage law pay rate which becomes effective Mar. 1.

United Telephone Co. of Kansas, Abilene, is asking an increase totaling $72,031 annually from 33,061 subscribers in 65 towns.

The McKrae Telephone Co., also of Abilene, is asking an annual hike of $25,581 affecting 5,000 customers in 13 towns.

Three other telephone companies also are seeking increases. They are the Wamego Telephone Co.; the Peoples Mutual Telephone Co. of LaCygne, and the Formoso Mutual Telephone Co.

The Wamego company is asking an additional $12,274 a year from 1,323 subscribers; the LaCygne company, $4,658 annually from 523 customers, and the Formoso exchange, $1,520 a year from 269 subscribers.

A Mar. 6 hearing has been set by the Kansas State Corporation Commission on the United application, with the others to be heard between Mar. 9 and 20.

Virginia Commission OKs Sale of Independent to C&P

The Virginia Corporation Commission on Feb. 13 approved acquisition of the property of the Twin County Telephone Co., Richmond, by Chesapeake & Potomac Telephone Co.

Twin County has been serving portions of Henrico and Charles City counties. In July, 1953, the commission ordered Twin County to show cause why it should not be penalized for failure to furnish adequate service, citing "many complaints."

Transfer of the telephone plant and other properties, as well as the franchise areas, are "in the public interest because of proximity of Twin County Telephone Co. to the Richmond exchange of Chesapeake & Potomac Telephone Co.," the commission said in its order.

Two Missouri Independents Request Rate Raises

The Albany Telephone Co. filed with the Missouri Public Service Commission on Feb. 14 an application for authority to raise rates to cover increased operating costs resulting from the law fixing minimum wages at $1.00 per hour.

The Bolivar Telephone Co. on the same date made a similar application.

N. C. Independent Given Permission for Rate Raise

The Randolph Telephone Co., Liberty, asked the North Carolina Utilities Commission on Feb. 16 for permission to raise its rates $5,459 a year, and also asked approval of a $237,000 loan made to it by the Rural Electrification Administration.

The company, which serves 400 subscribers in Liberty, and also serves parts of Alamance, Chatham and Randolph counties, said it needs the increased revenue to meet mounting operation costs, to pay for plant improvements and to attract capital needed to expand and improve its service.

The proposed rate increase would raise one-party residence charges from $3.00 to $4.00; two-party from $2.50 to $3.25; four-party from $2.25 to $2.75, and multi-party from $2.25 to $2.75. One-party business charges would be increased from $4.00 to $6.50; two-party from $3.50 to $5.25; four-party from $3.00 to $4.00, and multi-party from $3.00 to $4.00.

Illinois Independent Effects Rate Raise

The vice president of the Ohio Telephone Exchange, Tom Moore, recently announced that the following rate increases had been authorized for the Odin company by the Illinois Commerce Commission:

	Old	*New*
One-party residence	$2.75	$3.25
Two-party residence	2.25	2.75
Four-party residence	2.00	2.50
Multi-party residence	2.25	2.50
One-party business	3.25	3.50
Switching service	.85	1.25

Sues Over Charge Levied on Incomplete Instrastate Calls

Suit has been filed in Colorado Springs, Colo., against the Mountain States Telephone & Telegraph Co. asking for a permanent injunction against its practice of levying a 20-cent service charge on all incompleted intrastate long distance telephone calls.

The petition, filed in district court by the El Paso County Taxpayers Assn., charges that such a practice is "unjust, unreasonable, discriminatory and void." It said the company has been making such report charges for the past six years.

There is no fee on incompleted interstate calls, however.

The association asks the court to find

(Please turn to page 34)

You and your carrier can grow together

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It is a low-cost, easy-to-use system that really fits your budget. And it is easy to install, easy to maintain, easy to expand. (You can start with a single channel, add a second, then a third.) There are no more lines to string, no construction man-hours wasted. It is by far the least expensive, least complicated way to add new channels; in fact Lenkurt Type 33A often proves-in over distances as short as 7 miles!

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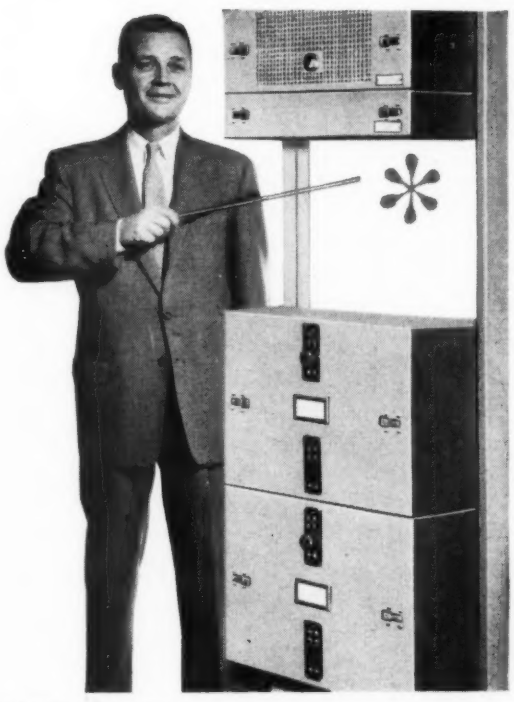

LENKURT TYPE 33A CARRIER *gives you new telephone channels with* ● *no new poles* ● *no new lines* ● *no added construction crew — just this simple, compact unit.*

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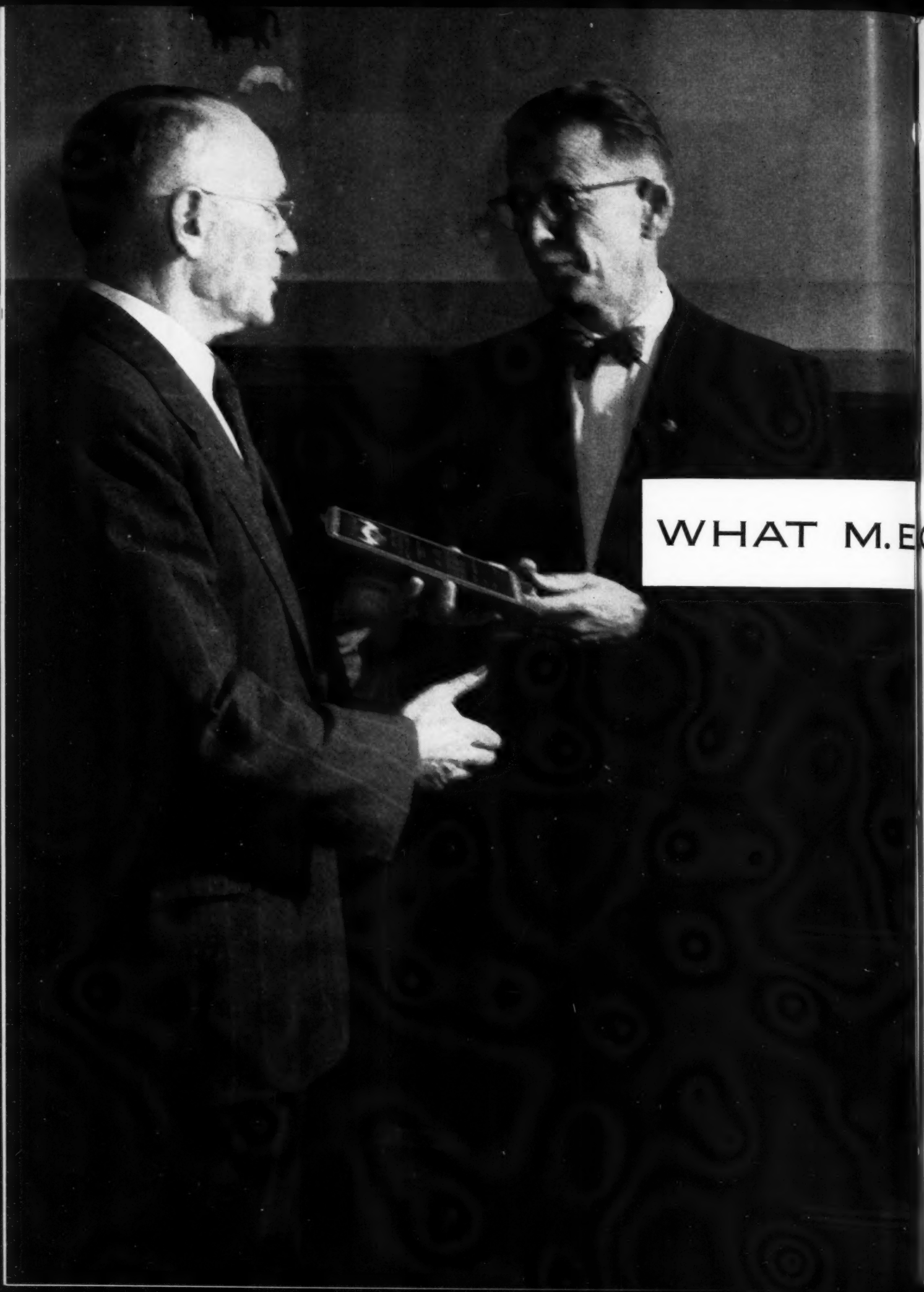
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brought Mr. Griffins (right) the Talbot G. Martin Award.
Here, L. L. Ruggles, Chief Telephone Engineer
of Automatic Electric, makes the presentation.

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Morris E. Griffins is a remarkable man.

He's an engineer, here at Automatic, and he possesses the unique and wonderful faculty of being able to *remember in detail*, thousands of Strowger Automatic circuits. Recently he became the twenty-second man to receive the Talbot G. Martin Award—the highest honor we folks at Automatic Electric can confer.

"Griff"—as we affectionately call him—earned this award for his many contributions to the success of Strowger Automatic. His greatest contribution, however, has been to you.

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ORIGINATORS OF THE DIAL TELEPHONE

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that exaction of the 20-cent charge is illegal, that the money collected from it previously should be returned to telephone subscribers and that a permanent injunction be issued against the practice.

Ohio Commission Hears Rate, Stock, Bond Pleas

On Feb. 10 the Ohio Public Utilities Commission authorized an increase for the Arthur Mutual Telephone Co. amounting to a rate of return of 2.48 per cent on applicant's rate base of $96,403.57. The rate base is a reproduction cost new less depreciation.

The company had recently rebuilt its plant through a loan with the REA. The commission found that after rebuilding, the rates and charges were not sufficient to provide the company with an adequate return on the value of its property.

The following are the rates authorized:

One-party business	$8.00
One-party residence	6 00
Two-party business	7.00
Two-party residence	5.00
Four-party business	6.50
Four-party residence	4.50
Multi-party business	6.00
Multi-party residence	4.00

*

The Community Telephone Co., Leipsic, engaged in rendering telephone service in exchanges in Belmore, Gilboa, Leipsic and Pandora, has recently made application to the Ohio commission for an increase in rates and the secretary of the commission filed the commission's report of its investigation on Feb. 1.

The report setting forth the engineering and accounting departments' investigation, determines the rate base of the company to be $383,235.20. The proposed rates and adjusted expenses will provide for income available for fixed charges of $16,179.70 or a rate of return of 4.22 per cent upon the aforesaid rate base.

The reproduction cost new of the company's property was determined as $507,079.13 and with an allowance of $9,744.00 for material and supplies and working capital, amounted to a total of $516,823.13. This amount less the observed depreciation of $133,587.93 left a rate base of $383,235.20.

The company serves approximately 2,112 stations in its four-exchange area.

*

The commission recently authorized the following security issues:

The Chillicothe Telephone Co. to issue 286½ shares of no par common capital stock with a stated value of $63 per share as a stock dividend to be distributed on the basis of one share for each 50 shares presently outstanding.

The Delta Home Telephone Co. to issue and sell its note or notes in the principal amount not to exceed $53,-109.83 at an interest rate not to exceed 5 per cent per annum, to reimburse the treasury for capital expenditures.

The Western Reserve Telephone Co., Hudson, recently acquired approximately 14½ per cent of the total shares issued and outstanding of The Elyria Telephone Co., following approval by the Ohio commission of the purchase of 25,600 shares of no par common capital stock at a stated value of $24.50 per share.

Rate Increases Granted to Two California Companies

Extended area service was authorized recently in all or portions of 14 exchanges of Pacific Telephone & Telegraph Co., and General Telephone Co. of California. Santa Monica, in Los Angeles and Orange counties (TELEPHONY, May 21, 1955, p. 37).

The California Public Utilities Commission said its order will save $47,000 yearly in toll charges to more than 70,000 subscribers.

Involved are: General Telephone Co. exchanges in Westminster, Laguna Beach, Huntington Beach, all Orange County, and portions of Downey, Whittier and Long Beach in Los Angeles County.

Also: Pacific Telephone & Telegraph Co. exchanges in the Cypress central office of the Anaheim exchange, Brea, Buena Park, Newport Beach, Fullerton, Garden Grove and Santa Ana, all in Orange County.

The order provides for extended area service in all Orange County exchanges.

To offset revenue losses due to elimination of toll charges, the commission authorized rate increases ranging up to $1.00 for four-party subscribers, up to 20 cents for two-party service, up to $1.25 for single-party service and up to $5.70 for certain business telephones.

Gets Sinking Fund Note OK

North State Telephone Co., High Point, was authorized by the North Carolina Utilities Commission on Feb. 17 to sell a $500,000 sinking fund note to the Connecticut General Life Insurance Co., Hartford, Conn., for a 25-year period at an interest rate of 3⅝ per cent to raise funds for further expansion and extension of its facilities (TELEPHONY, Feb. 18, p. 34).

N. C. Independent Given OK To Increase Rates

The Albemarle Telephone Co. was authorized by the North Carolina Utilities Commission on Jan. 23 to increase its rates $31,218 a year (TELEPHONY, Aug. 27, 1955, p. 34).

The company had requested an annual increase totaling $56,874, but the commission said the increase allowed would enable it to earn a return of 6.5 per cent on its investment.

Exchanges operated by Albemarle Telephone, now merged with the Concord Telephone Co. (TELEPHONY, Dec. 17, 1955, p. 42), are at Albemarle, Oakboro and Badin. The Oakboro exchange has been converted to automatic, the Badin exchange is being converted and the Asheboro exchange will be converted to automatic on Dec. 15. Toll-free service will be provided between all the exchanges when the Albemarle automatic system is completed. It already is provided between Albemarle and a new exchange at New London and from Oakboro to Albemarle. Elimination of the toll charges will result in a loss of approximately $8,500 in toll income.

In its order, the commission said it wanted to look at the company's rates and charges about six months after the Badin and Albemarle exchanges have been converted to automatic operation. The company serves 6,000 customers.

Authorizes Sale of Oregon Independent Company

The Oregon Public Utilities Commissioner on Feb. 17 authorized Alice E. Bosshardt, doing business as the Home Telephone Co. of Lafayette, to sell all the company's telephone plant facilities to the Sunnyside Telephone Co.

The Sunnyside company was authorized to issue to Alice E. Bosshardt 7,500 shares of its $1.00 par common stock in payment for the properties.

Missouri Commission Rejects Two Rate Raise Pleas

The Missouri Public Service Commission recently rejected rate increase requests of two Independent companies.

In one case, involving the Bourbon Telephone Exchange, the commission said the owner, C. E. Murphy, failed to show a need for proposed pay increases for the telephone operators or for paying his wife a salary as a clerk.

The commission said in another case that the Triangle Telephone Co. couldn't increase rates for service from its Dixon exchange alone. The commission told the company to submit new rate schedules for its Dixon, Crocker, and

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PENTA-treated poles going up: a wise investment in wood. Remind him that PENTA-treated poles cost no more, but have four long-lasting advantages.

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The real clincher that makes a purchase of PENTA-treated poles the bargain it is: You can get all these advantages at *no extra cost*, making PENTA treatment the best buy in treated poles.

Finally, tell your president about all the user specifications that cite clean *PENTAchlorophenol treatment. Now . . . show him your copy of your most recent pole order. He's sure to ask if you've ordered *enough* PENTA-preserved poles. You did, of course, and thanks to wide availability you had no difficulty in locating a convenient source of supply for PENTA-treated poles. THE DOW CHEMICAL COMPANY, Dept. PE-979C-1, Midland, Michigan.

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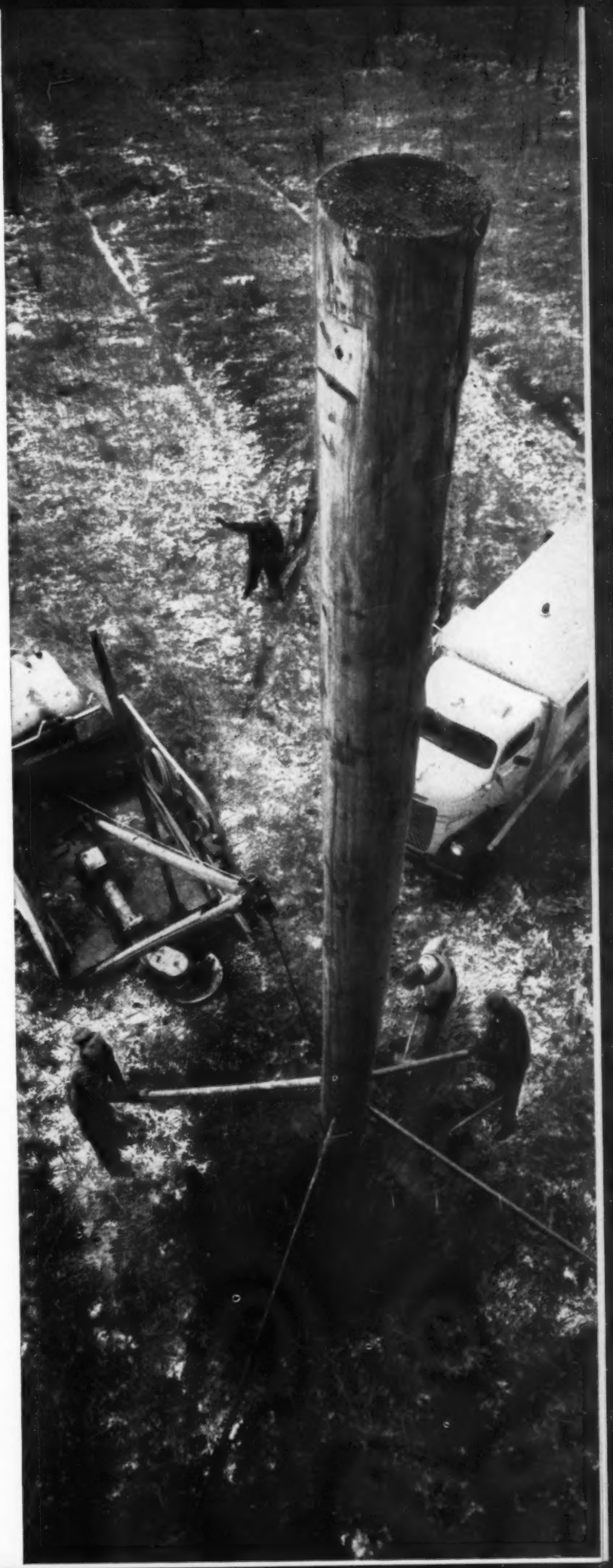

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Iberia exchanges since the three are managed from a single office.

The commission also rejected the Triangle company's argument that it is retaining three full-time operators and a part-time operator even though the Dixon exchange has been converted to dial service. The company said the help was being kept on at an annual cost of $5,460 because long distance service through Rolla is "not fully satisfactory."

Authorizes 6.5% Return for California Independent

On Feb. 7 the California Public Utilities Commission issued its decision on the application of A. A. Harrington, doing business as Livingston Telephone Co., for authority to increase rates and charges for exchange telephone service. The application was filed for the company by the California Independent Telephone Association on Sept. 30, 1955, and one day of hearing was held on Dec. 28, 1955 at Livingston.

The application requested rates that would have increased the company's gross annual revenue by $12,400, resulted in a net operating revenue of $6,400 and provided a rate of return of 6.84 per cent on an average depreciated rate base of $93,538.

The commission authorized rates slightly lower than those requested, which rates the commission estimates will increase gross annual revenues by $9,120, provide net operating revenue of $6,850 and result in a rate of return of 6.5 per cent on an average depreciated rate base of $105,300.

Presently effective rates and those authorized by the commission for basic exchange services are compared in the following tabulation:

	Present	*Authorized*
Residence:		
One-party	$2.75	$3.75
Two-party	2.25	3.20
Four-party	1.75	2.65
Ten-party Suburban	2.75	3.15
Farmer line	.50	.75
Business:		
One-party	3.75	6.00
Two-party	3.00	4.75
Ten-party Suburban	3.25	4.50
Farmer line	.75	1.25

Upholds Illinois Commission

The Circuit Court of Adams County upheld the order of the Illinois Commerce Commission in a decision handed down on Feb. 4, wherein the commission denied the Payson Farmers Telephone Co. authority to sell their physical property to Adams Telephone Cooperative (TELEPHONY, Aug. 13, 1955, p. 44).

Court Reopens Hearing on New York Bell Rate Raise

The Court of Appeals ordered the New York Public Service Commission to reopen its hearing on the New York Telephone Co.'s bid for a $68,850,000-a-year rate raise (TELEPHONY, Dec. 24, 1955, p. 26).

The state's highest court, in a 4-to-1 decision, upheld a finding of the Appellate Division, which last May held that the commission should reopen hearings in the case.

The commission turned down the company's rate increase request in August 1954, and refused two months late to reopen the case.

The company says it needs additional income to meet rising operating costs and to attract capital for expansion.

Four Minn. Companies Gain Raises Due to New Wage Law

Four Independent company rate increases were approved on Feb. 8, 9 and 10 by the Minnesota Railroad & Warehouse Commission to enable the companies to offset effects of the 1955 amendment to the federal Fair Labor Standards Act (TELEPHONY, Nov. 26, 1955, p. 32).

The four Independents, the number of stations each serves, and the total amount of the rate increases are as follows:

Dwelle Telephone Co., Lake City:	
Local stations	1,588
Rural stations	677
Amount of rate increase	$8,215
Lake Crystal Telephone Co.:	
Local	563
Rural	391
Rate increase	$4,234
Pioneer Suburban Telephone Co., Waconia:	
Local	920
Rural	858
Rate increase	$4,187
United Telephone Co., West Concord:	
Local	299
Rural	374
Rate increase	$3,364

New England T&T Permitted Rate Raise in New Hampshire

The New England Telephone & Telegraph Co. on Feb. 16 received permission of the New Hampshire Public Utilities Commission to increase rates by $353,000 per year, following the public hearing of Feb. 14 (TELEPHONY, Feb. 4, p. 31). Chairman Harold K. Davison and Commissioner Blaylock Atherton approved the company's petition, and Commissioner Edward R. Thornton isued a minority report favoring an increase of $221,000.

The majority finding was to the effect that the company has failed to earn a rate of return on the investment consistent with earlier decisions of the board. This return was established four years ago as between 5.5 and 6 per cent.

The minority member stated that in his opinion increased compensation for stockholders and employes is justified to a point provided there are accompanying benefits to the rate-paying public; but he was opposed to requiring the rate payer to assume the entire burden of such increases. Mr. Thornton said that he would give the company a 5.75 per cent return on its investment, subject to its ability to raise this to 6 per cent by proper economies, increased productivity and technical improvements.

Missouri Independent Given Authority to Purchase

Chariton Valley Telephone Corp. on Feb. 14 was given Missouri Public Service Commission approval to borrow an additional $252,000 from the REA to purchase and modernize mutual telephone properties at Jacksonville, Duncan's Bridge and Prairie Hill (TELEPHONY, Feb. 11, p. 36).

The new loan will bring Chariton Valley's total REA indebtedness to $594,000. It is currently nearing completion of a modernization program at the purchased exchanges in Bucklin, Ethel and Bynumville.

Chariton Valley is one of the youngest telephone corporations in the state, with an approved operating area in Randolph, Macon and Monroe counties.

Illinois Governor Renames Two to Commission

Governor Stratton recently reappointed two members of the Illinois Commerce Commission for five-year terms. The reappointments went to Judge June G. Van Keuren, Republican, of DuQuoin, and Cyrus J. Colter, Democrat, of Chicago.

Both were appointed by former Governor Adlai E. Stevenson in 1951.

Nebraska Company Votes Rate Increase

The Palmyra (Neb.) Telephone Co. at its recent annual meeting voted to increase rates because of an anticipated increase in operation expenses.

Multi-party and rural rates were to be increased from $2.35 to $2.50, one-party residence from $2.65 to $3.00, and one-party business from $3.15 to $3.75.

Asks N. C. Sale Approval

United Telephone Co. of the Carolinas, Southern Pines, asked the North Carolina Utilities Commission on Feb. 17 for authority to sell its Ansonville

ESCO RINGING EQUIPMENT

MEMBER

ADDITIONAL ESCO FEATURES (details in future ads pictured on the dial) — further explain why Esco components are included in installations of prominent suppliers like Automatic Electric Co., Federal Telephone and Radio Corp., Kellogg Switchboard and Supply Co., Leich Sales Corp., and Stromberg-Carlson Co.

permanent, precise alignment gives a quieter, smoother drive

The whispering-soft, velvet-smooth operation of an ESCO ringing assembly comes from its unique drive design. To begin with, motors and driven units are factory mounted in precise alignment. They never need to be touched again, even to change belts. An idler pulley provides initial belt tension. To change belts, it is only necessary to loosen the idler pulley, remove old belts from the sheaves, and replace with new ones. By keeping accurate alignment, belts last longer.

Less friction, lighter bearing loads, and less driving power are some mechanical advantages of this outstanding drive system. They add up to longer life, smoother operation and less maintenance for you.

But care and attention to important details like this is just one of many reasons why ESCO is preferred by engineers, suppliers, and users alike. The full facts are yours for the asking in our new brochure, ESCO RINGING EQUPMENT. Send for it today.

Write today for full information

ELECTRIC SPECIALTY CO.
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exchange and properties in that area to the North Carolina Telephone Co.

Wis. Independent and Bell To Exchange Properties

The Big Bend (Wis.) Telephone Co., an affiliate of the Urban Telephone Co., Clintonville, Wis., will take over the operation of the Shawano exchange from the Wisconsin Telephone Co., in the near future, it was announced jointly on Feb. 9 by Raymond C. Terrien, Green Bay district commercial manager for the Wisconsin Telephone Co., and Forest Schafer of Clintonville, secretary and general manager of the Big Bend company and secretary of the Urban Telephone Co.

As part of the transaction by which the Big Bend Telephone Co. obtains ownership of the Shawano exchange, the Wisconsin Telephone Co. will acquire ownership of the Big Bend Telephone Co.'s property serving Big Bend, Muskego and Prospect, in southeastern Waukesha County. These communities are adjacent to the Wisconsin Telephone Co.'s Milwaukee and Waukesha service areas.

It was pointed out that the exchange of ownership of these telephone properties will be mutually beneficial to the companies and their subscribers, since the companies will then be serving communities located within their normal geographical service areas and will be better able to integrate their operations.

The companies will proceed promptly to obtain approval of the Wisconsin Public Service Commission. No change in telephone rates is contemplated with the shift, Schafer said.

The new manager of the exchange in Shawano will be A. O. Sander, who has been general superintendent of the Big Bend Telephone Co.

Wisconsin Companies Request Rate Raises

The Wisconsin Public Service Commission was scheduled to hear the following applications for rate increases in February:

On Feb. 21, the Westby Telephone Co.; Feb. 23, the Arkansaw Telephone Co.; Feb. 24, the Baldwin Telephone Co. to increase rates at Baldwin and Woodville, and the application of the Southeast Telephone Co. of Wis., Inc.

Tenn. Company to Purchase

A proposal that the Powell Valley Telephone Co. be allowed to purchase Rutledge Telephone Co. was to be given a hearing before the Tennessee Public Service Commission on Jan. 25.

Approve Kansas Rate Raise To Offset Wage Increase

Border Telephone Co., which serves about 1,200 subscribers at Syracuse, Johnson and Manter, has been authorized a $7,100 annual rate increase by the Kansas Corporation Commission (TELEPHONY, Jan. 14, p. 36).

The commission said the raise was allowed to meet labor costs which will be increased Mar. 1 under the minimum wage law.

South Carolina Continental Installs Microwave

South Carolina Continental Telephone Co., Sumter, recently constructed a 100-foot self-supporting microwave tower adjacent to its Sumter building. The installation is a part of a microwave system to be placed in service by the company, to provide long distance telephone facilities between Bishopville and Sumter. A similar tower has been completed at Bishopville.

Shown above are workmen hoisting the parabolic antenna atop the 100-foot self-supporting microwave tower which was recently constructed by South Carolina Continental Telephone Co. at the rear of its Sumter building.

The system will operate in the ultra high frequency band and will initially provide 12 circuits, which may be expanded as required.

Gordon Saunders, president of the company, said that the system is scheduled to be placed in service coincident with the cut-over of the Bishopville exchange, from manual to automatic operation, scheduled for May of this year.

Mr. Saunders said that the system embodies the finest technical developments in communications and will furnish almost-trouble-free as well as high quality voice transmission. The system will provide entirely new long distance outlet facilities for Bishopville, replacing existing land wire lines.

AT&T Names James W. Cook To Merchandising Post

James W. Cook, vice president in charge of rates and revenues for the American Telephone & Telegraph Co., has been appointed vice president in charge of merchandising. Mr. Cook will succeed Bartlett T. Miller on his retirement. E. Hornsby Wasson, vice president in operations, AT&T, will take over the duties of Mr. Cook. Both appointments are effective Mar. 1.

Mr. Cook began his business career in 1929, as a traffic student with New Jersey Bell. He later held various assignments in the AT&T company, the Pacific Telephone & Telegraph Co., and the Northwestern Bell Telephone Co. in Omaha. He became operating vice president of the Northwestern company in 1953. A year later, Mr. Cook returned to AT&T in his present capacity.

Mr. Wasson started in the telephone business in 1926 as a salesman for Southern Bell Telephone & Telegraph Co. in Chattanooga, Tenn. He was appointed general commercial manager in 1947. Three years later, Mr. Wasson became vice president, public relations, of the Northwestern Bell Co. in Omaha and the following year was placed in charge of the company's Minnesota area. He was named vice president of AT&T company in 1952 and assumed his present duties in April 1955.

Total Annual Wages Up 39% Over Five Years Ago

Total wages and salaries, except for government payrolls, climbed to 173 billion dollars in 1955, a 39 per cent increase above those of five years ago when they reached 124 billion dollars, according to a report prepared by the National Association of Manufacturers' research department from government statistics.

The report stated that this record high level was the result of the greatest number of people working at the highest pay rates in history. Statistics showed that the average hourly wages in manufacturing were 28 per cent higher in 1955 than they were in 1950.

Total corporate profits for the comparative period were about the same. In 1950 profits were 22.1 billion dollars, somewhat higher than the 21.8 billion estimated for 1955. The report concluded that despite the greatest production and sales year ever, a larger number of corporations earned no more than they did five years ago.

Experimental model of Bell's new high-frequency transistor. It has a cut-off frequency of at least 500 mc and can be used to amplify 2500 independent voices simultaneously.

THE TRANSISTOR
that smashed a frequency barrier

A new transistor invented at Bell Telephone Laboratories can provide broadband, high-frequency amplification never before possible with transistors. The big leap in frequency is made possible by a diffusion process that earlier enabled Laboratories scientists to create the Bell Solar Battery.

This transistor is a 3-layer semiconductor "sandwich." High-frequency operation is obtained by making the central layer exceedingly thin. This was difficult to do economically by any known method.

The new diffusion process, however, easily produces microscopic layers of controllable thickness. Thus it opens the way to the broad application of high-frequency transistors for use in telephony, FM, TV, guided missiles, electronic brains and computers.

The new transistor shows once again how Bell Laboratories creates significant advances and then develops them into ever more useful tools for telephony and the nation.

A Bell scientist checks temperature as arsenic vapor diffuses into germanium, creating 4/100,000-in. layer.

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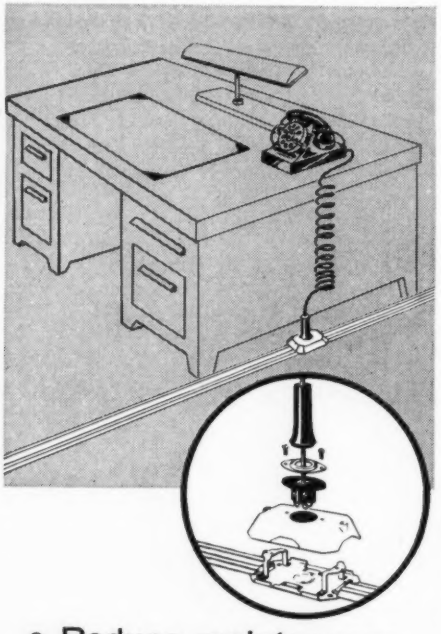
PANCAKE FITTING

permits free desk movement

. . . accommodates the 47-B Connecting Block in floor outlet!



- Reduce maintenance and repair costs
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Individual communications wiring to office desks is made *easier* and maintenance and repair costs cut to a *minimum* by this new Wiremold 1546T fitting. It accepts the 47B Connecting Block in the floor outlet which allows the telephone set mounting cord to terminate in the connecting block. No physical attachment of apparatus to the desk should normally be required.

Just *one more reason* why Pancake is the *best way* to carry communications wiring over-floor to the point of use.

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TROUBLE CLEARING—ANGLES, ELECTRICITY

Concluded from page 25

voltage starts at zero at the point marked O° and increases in the upward direction which we will call positive. It reaches its maximum value at 90°, then begins to decrease, reaching zero at 180°. However, this is not the end of the cycle as the next step differs from the first step.

The voltage again increases but in the opposite direction which we will call negative. It reaches its maximum negative value at 270°, then returns to zero at 360°. The next four steps are the same as the first four steps, therefore, 360° ends the first cycle and starts the second cycle.

We show the degrees continuing from 360° to 720° in the second cycle, which is sometimes useful. For other purposes we would make a new start with O°.

In a true sine wave form, the increase from zero to maximum and the decrease from maximum to zero is not at a uniform rate. Let us look for a moment at *Fig. 4*, which represent a half cycle of alternating voltage having a frequency of one cycle in 12 seconds. The figures 0 to 6 under the horizontal line indicate seconds and the figures 0 to 3 to the right of the vertical line indicate volts.

By studying this figure, it may be readily seen that during the first second the voltage increases 2.2 volts; during the second second, .6 volts; and during the third second only .2 volts. The decrease in the next three seconds is as follows: Fourth second, .2 volt; fifth second, .6 volts, and sixth second, 2.2 volts.

Therefore, the *rate* of change in voltage is very rapid as it swings through the zero line and is very slow as it passes through its maximum value (positive or negative). There is an instant at maximum when the rate of change is zero. This is an important feature of the sine wave which we will discuss in another article.

Now, let us return to *Fig. 2* and assume that the curve represents the voltage of a 20-cycle ringing machine. "Twenty-cycle" means that the voltage (and hence the current) makes 20 cycles in one second, or that each cycle has a duration of one-twentieth second. If, in this case, 360° stands for one-twentieth second, a little arithmetic tells us that the curve reaches 90° in one-quarter of 1/20 second or 1/80 second; 180° in one-fortieth second; and 270°, 3/80 second. We show these figures below the curve.

However, these time figures would apply to the 20-cycle frequency only, while the measurement in degrees will apply to any frequency. *The point that we want to bring out is that, in this case, we are actually measuring time.* This should overcome some of the confusion that the student may have in mastering this subject.

In *Fig. 3*, curve A is the same as the curve in *Fig. 2* and may represent voltage or current. Curve B "lags" A by 90°, i.e., it is zero when A has reached its maximum at 90° and B reaches its maximum at 180° when A has returned to zero. We also may say that A "leads" B by 90°.

Curve A may represent the voltage of a generator and B the current from the same generator. (90° would be an unusual lag in this case but it will illustrate the principle.)

Curve A could represent the current entering the primary of a transformer or repeating coil and B the current induced in the secondary. These currents are usually 90° out of phase. There are other elements in a circuit that can cause the current to lag or lead the voltage. These will be discussed in a future article.

If the alternating voltage is produced by a simple form of ac generator having a single winding on its armature, and one positive and one negative pole in its field (such as a hand generator), any point in the voltage cycle is directly related to the position of the generator armature.

When the poles of the armature are midway between the poles of the field, no voltage is produced as the armature is moving parallel to the lines of force produced by the field and is not cutting any of these lines. This corresponds to 0° or 180° on the voltage curve.

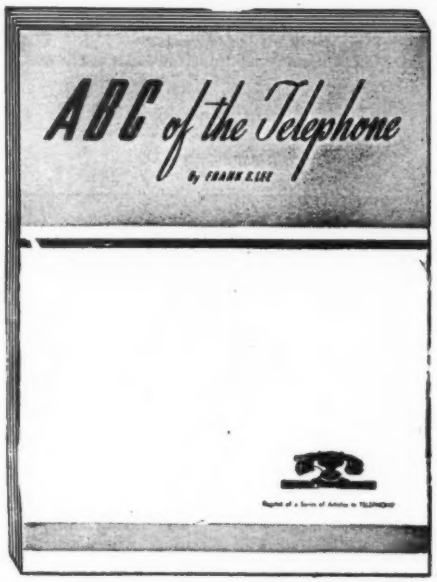
Ninety degrees later the armature swings past the pole pieces, cutting the maximum number of lines of force and producing its maximum voltage. This corresponds to 90° or 270° on the voltage curve. This is another reason for using angular measure in alternating current work.

There are other ways in which angles and angular measurement play a part in alternate current studies. These will be discussed in our next article.

Cal. Company Sells Stock

The 150,000-share common stock offering of California Water & Telephone Co., Monrovia, was sold and the books closed, Blyth & Co., Inc., managing underwriter, announced on Feb. 9. (TELEPHONY, Jan. 28, p. 38).

Volumes I & II of
"ABC OF THE TELEPHONE"
Now Available
Both Written in the Telephone Man's Language



Volume I is an 84-page booklet of 21 installments of the popular series by Frank E. Lee, appearing currently in TELEPHONY. Includes circuits, transmitters, receivers, induction coils, generators, ringers, relays, line protection, dials, automatic switching, principles of protection, drop wire installations.

Volume II is an 80-page booklet of 20 installments. Covers installation and maintenance of Sub-Station Protectors, Station Wire Installation, Subscriber Installation, Fault Locating, Relay Circuit Analysis, Planned Maintenance Program, Electronic Testing of Aerial Cable and Drop Wire, Plant, Transmission Developments and Loading Coil Theory.

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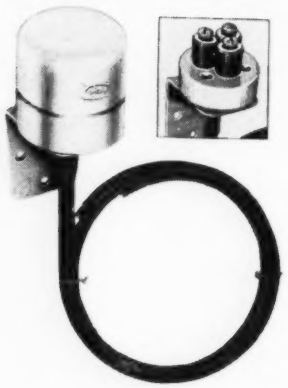
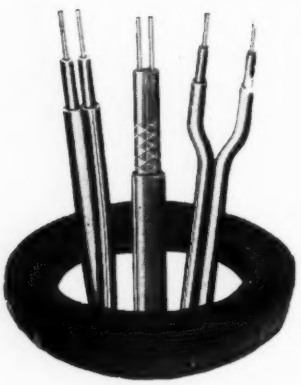


The Cook Hy-Cap Power Cross Protector is designed for use where there is a possibility of contact between communication circuits and power circuits. It also will furnish considerable protection from lightning damage. A product of COOK ELECTRIC COMPANY.

Versatile Plastic Screw Anchor meets needs of telephone industry. For use in all materials from plasterboard to concrete, indoors and out. Outstanding bonding and fusing action. No special tools required. Savings up to 70%. HOLUB INDUSTRIES, INC.



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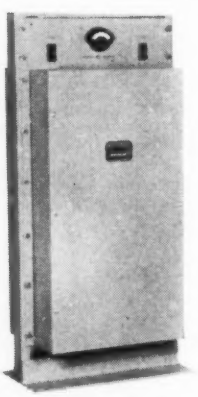

Automatic Constant Voltage Charger – operates without moving parts. Compensates for changes in input voltage load. Single-Phase Flotrol in the 24 and 48 volt types are available in ranges of sizes from 1 to 24 amperes. LORAIN PRODUCTS CORPORATION.

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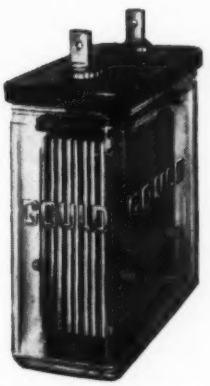

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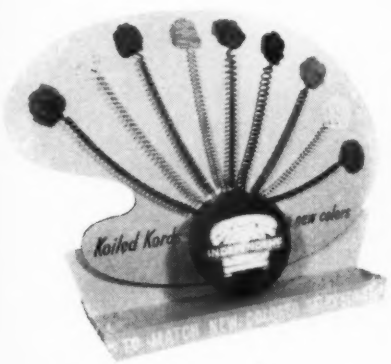

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Type D — a truly great extension ladder built in strict accordance with safety regulations. Rungs are second growth hickory, reinforced with steel rods and equipped with special automatic locks and Duo-Safety's famous Safety Shoes. Made with either straight or parallel side rails, Type D is available in one, two or three sections — in a large variety of sizes. Write for free catalog on all Duo-Safety ladders.

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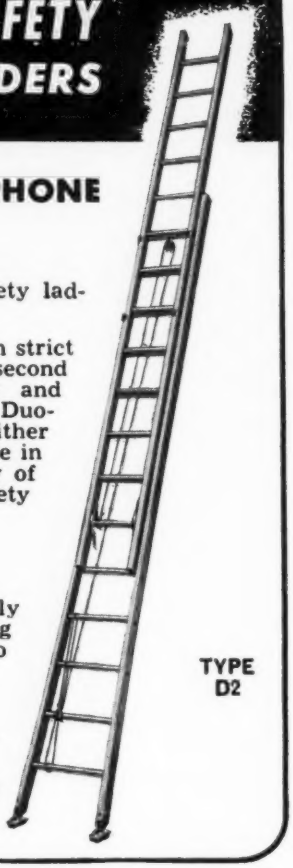

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In the same trench, Soapstone OCT-O-DUCT is carrying primary and secondary telephone, primary and secondary power, street lighting and fire alarm circuits for the new, $50 million industrial, commercial and residential Trousdale Development 17 miles south of San Francisco.

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REA LENDS IN 5 STATES

Concluded from page 19

The three REA loans, totaling $446,000, will enable the Griswold cooperative to furnish new and improved service to 1,065 rural subscribers over 201 miles of line in Cass and Pottawattamie Counties. Present plans include service without toll charge among all three exchange areas, at Griswold, Lewis and Lyman.

Clair Wilson is president of the Griswold cooperative company.

RADAR ENTERS FIELD

Concluded from page 23

millionth of a second, it is not harmful to personnel or plant.

References

The circuit diagrams used here were derived from material furnished by the Sierra Electronic Corp. of San Carlos, Cal.

The basic radar circuits are explained in greater detail in *Radio Engineering* by F. E. Terman. (This book may be purchased from Telephony Publishing Corp.)

A more complete explanation of the operation of vacuum tubes and other circuit components is contained in the reprint *Electrical Principles Used in Carrier Systems* which may be purchased from the publishers of this magazine.

The experience of a power company with this type of instrument is related in "Electronic Pulse-Type Fault Locator Experience" by R. L. Brinton. This appeared in the April, 1955, issue of *Electrical Engineering*, published by the American Institute of Electrical Engineers.

(End of Series)

Day Mich. Bell President; Phalen Elected by AT&T

William M. Day, vice president and general manager of the Michigan Bell Telephone Co., was named president of the company, effective Mar. 1, succeeding Clifton W. Phalen, who was elected an executive vice president of the American Telephone & Telegraph Co.

Allen G. Barry, vice president—operations, of the Wisconsin Telephone Co. at Milwaukee, was named vice president and general manager of Michigan Bell to succeed Day.

Mr. Day has been vice president and general manager of Michigan Bell since 1950 after two years as vice president —public relations.

A native of Pittsburgh, Day began his Bell System career with the New York Telephone Co. in 1928, following his graduation from Yale University

C. W. PHALEN

the preceding year. He went with the AT&T company in 1936 where he was assistant vice president before joining Michigan Bell in 1948.

Mr. Day twice has been called to high government posts at Washington on loan from the Bell System. From 1941 to 1945, he was special assistant to Donald M. Nelson, of the War Production Board.

Later, he was a lieutenant-colonel in the Army Service Forces, Facilities Branch, and was awarded the Legion

W. M. DAY

of Merit. In 1952, he returned to Washington where he was assistant administrator of the National Production Authority.

Mr. Day is president of the 16½-million-dollar Metropolitan Detroit Building Fund. He also is a member of the board of the Detroit branch of the Federal Reserve Bank of Chicago; a trustee of Grace and Children's hospitals; and a vice president of the United Foundation. He also is a mem-

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For more information on their exclusive advantages, consult your telephone distributor.

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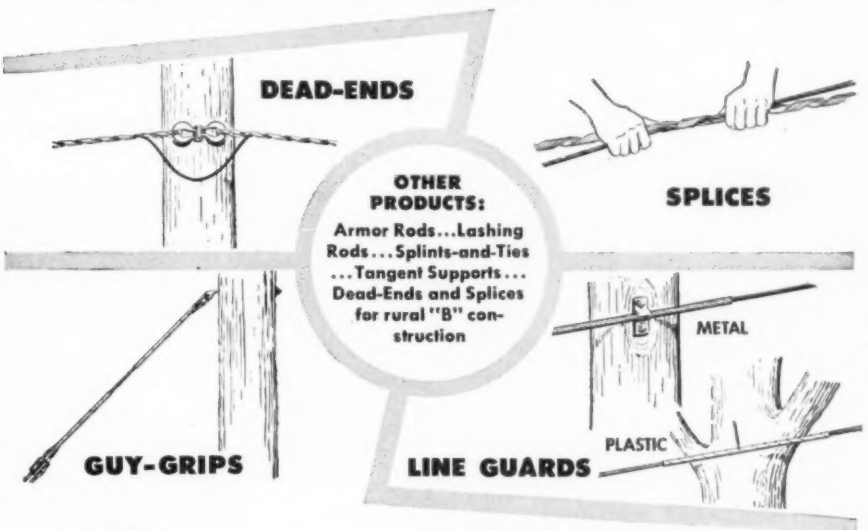

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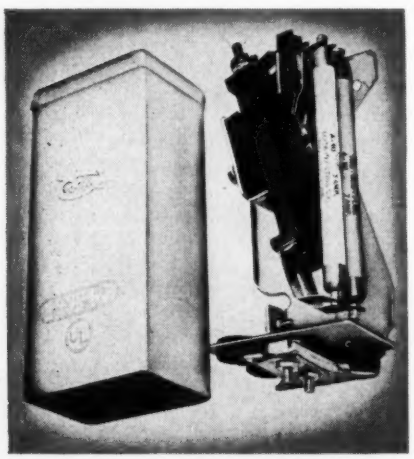
Protection plus—that's Cook Electric Company's type RO-9U sub-station protector.



The most highly protective sub-station protector available.

This rugged unit consists of a heavy Bakelite base, two 7-amp. ceramic fuses, two famous Tru-Gap dischargers and two secondary dischargers which will ground a fault current when the fuses blow. These are all mounted on a sturdy steel bracket and covered with a heavy gauge, weathertight, zinc hood.

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If you have looked into this problem, you'll be pleased to know that there is a machine that actually does just that—pins down each frequency and **locks** it by a definite ratio to the 60-cycle input frequency.

This machine is the Lorain H-5 Sub-Cycle. It uses a special principle of operation, making it **impossible** for your ringing frequencies to creep out of line.

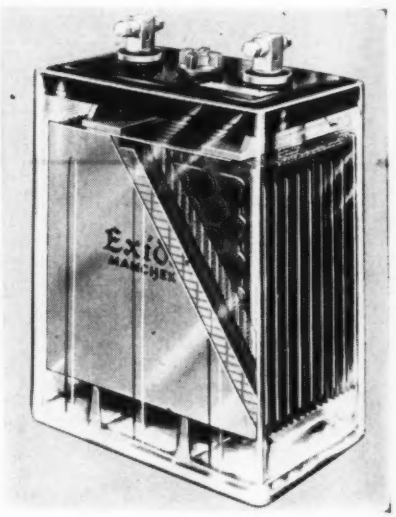
Add to this the fact that the H-5 Sub-Cycle provides exceptional voltage regulation—preventing ringing troubles—and you have a very useful machine indeed.

Lorain H-5 Sub-Cycle.

It's economical to operate, too—the H-5 Sub-Cycle has no moving parts, no expendable components. You just install it and forget it. And it requires only 1400 watts power at full load—slightly more than the full load requirement of a 1 H.P. induction motor.

Lead buttons mean lower costs

Only Exide Manchex Batteries have the positive plate with the buttons of corrugated lead tightly locked in the lead alloy grid several times more rigid than pure lead. Because of this outstanding design, the plates resist the mechanical strains bound to develop and retain their shape without growing or buckling. There is an ample reserve supply of pure lead which can be converted into active material as needed.



Special construction gives long life to Exide Manchex Batteries.

These and many other features combine to insure exceptionally long, trouble-free service.

To be sure of top quality, specify Exide Manchex Batteries when you order through your Stromberg-Carlson representative.

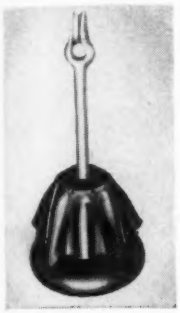
Best way to anchor guy wires

A guy-wire anchor has to do many things for you. It must hold the guy firmly in place, by getting a strong grip on the soil it's planted in.

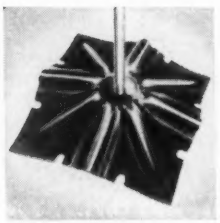
It must be easy to install, and it must have plenty of underground surface to hold it in place.

You can expand the Chance 8-Way expanding anchor with only eight or nine sharp blows. Its eight plates open to a full width that puts as much as 63% of the anchor under undisturbed earth. The guy load is distributed evenly over all of these blades, for maximum holding power.

There is no waste space between blades—when expanded, the anchor forms a complete pyramid-shaped square, providing a strong foothold. Sizes from 60 to 200 sq. in. in area.



8-Way anchor before installation.



After expansion.

Cane-seat chair keeps operators cool, comfortable

Making the operator as comfortable as possible may not strike you as a "maintenance" problem – yet your service is much smoother when the girls are cool and relaxed.

This operator's chair has a cane seat, which is much cooler, cleaner and more comfortable than other types. It retains all the posture advantages for which Sturgis is famed. It is called the Sturgis SC-240.

The posture-curved, well-cushioned backrest is covered in genuine leather.

The exclusive Sturgis "Follow-Flex" feature automatically adjusts to the operator's every movement, supports her restfully all the time, discourages fatigue, keeps her at top efficiency.

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ber of the Michigan Department of Economic Development.

Mr. Phalen has been president of Michigan Bell since 1952, going there from New York where he was a vice president of AT&T. He has been with the Bell System 28 years, starting as a lineman for the New York company at Syracuse just after graduation from Yale University. He was named division plant superintendent for the New York company in 1939 and vice president—personnel in 1944. In 1948, he was elected a vice president of the AT&T company.

Mr. Barry has been vice president—operations and a director of the Wisconsin Telephone Co. since 1948. A graduate of Harvard, he went with the New York Telephone Co. in 1928 as a student engineer. He became general traffic manager of the company's upstate area in 1945 and was general commercial manager of the same New York area before going to the Wisconsin company.

Outlines British Columbia Radio-Telephone Plans

Two new developments will feature the growth of the chain of radio-telephone circuits northward on British Columbia's coast, according to an announcement by B. R. Tupper, vice president and general manager of Northwest Telephone Co., Vancouver, Canada.

"Our present VHF (Very High Frequency) radio relay chain extends to the northern tip of Vancouver Island with a spur link to Ocean Falls" said Mr. Tupper, "but we hope this year to extend the chain to Kitimat, Prince Rupert, and the Queen Charlotte Islands.

"To do this we will use two methods —'island hopping' and 'forward scatter'."

Mr. Tupper went on to explain that to carry a VHF signal a long distance, a series of intermediate stations are required—relaying the waves one to the other in chain-like fashion. The VHF chain between Vancouver and San Josef at the northern tip of Vancouver Island is of this nature, requiring six relay stations between the two terminals.

To extend the chain from San Josef to Prince Rupert and Kitimat will require the erection of relay stations on a number of coastal islands. Hence the term, "island hopping."

The link from San Josef to Sandspit, on the Queen Charlottes will be the longest single VHF hop ever attempted by the North-west Telephone Co. To span the 240 miles between San Josef and Gray Bay (near Sandspit) a new technique of radio-telephone propagation known as forward scatter, will be used. Widely spaced antennas at Gray Bay will pick up the waves and special equipment will strengthen the signal.

This link, using "forward scatter," will go into operation soon. However, the number of circuits that can be economically obtained through the use of "forward scatter" is limited, and for this reason the more conventional relay station method will be used where a larger number of circuits are expected to be required.

In the meantime, the North-west company announced that selective signalling is now available for fixed and mobile radio-telephone stations working out of Vancouver terminals of the company.

The selective signalling equipment frees the radio-telephone subscriber from monitoring to determine whether his station is being called. A pilot lamp lights if the channel being used is busy and a second pilot lamp lights

New, light brick, air-conditioned exchange building of The Southwestern States Telephone Co. at College Station, Tex. Just cut into service were 1,800 lines and 3,500 terminals of Type 20 Strowger step-by-step equipment. Both College Station and its sister city of Bryan were changed to 2-letter, 5-numeral subscriber numbering, and were added to the nationwide operator distance dialing system on Feb. 5.

XUM

at Delta Telephone and Telegraph Co.

It's C&D Calcium Batteries for EXTRA life

One of C&D's typical installations in use at the Delta Telephone and Telegraph Co., Courtland, Calif. The 24 PlastiCal (lead-calcium) cells, Type PCE-420, have a 420 A.H. capacity.

In the growing community of Courtland, California, the Delta Telephone and Telegraph Co. relies on the continuous, dependable service provided by C&D PlastiCal batteries. For here, in the historic Delta region, the Delta Telephone and Telegraph Co. has found that C&D has the answer to telephone battery needs.

When you order your next telephone battery, specify C&D. For with C&D, you get:

1. **One-piece, permanently-sealed plastic case. Entire unit is shock-resistant, lighter, and more compact than glass or rubber.**
2. **Exclusive suspended and supported plate construction eliminates leaks due to internal stresses.**
3. **Easier maintenance, because patented Post Seal eliminates acid creepage.**
4. **Lower shipping costs. Light plastic case reduces total in-place cost.**

You can order C&D batteries from your equipment supplier.

Write for bulletins!

For details and specifications on C&D telephone batteries, write for Bulletins T-527 and T-528.

C&D

BATTERIES, INC.

of Conshohocken, Pa.

Manufacturers of Industrial Batteries since 1908

Sales and Service Offices in Principal Cities from Coast to Coast

when the station is being called. In addition, a buzzer sounds to catch the attention of the subscriber. The call-indicator pilot lamp remains lighted until the subscriber answers the call. This feature is of particular interest to mobile subscribers as they will be able to tell if a call has come in while they were out of the car.

An additional feature of the selective signalling equipment is that the telephone operator in Vancouver is able to call a subscriber, who has the equipment installed, by dialing his number, rather than calling him by voice.

Soviet Newspapermen Visit a Stock Exchange

A group of top Soviet newspapermen recently toured this country. Shortly after their arrival, these reporters were taken on a visit to the nation's principal stock exchange.

That must have been quite a revelation to them. For there is no stock exchange in Russia — and there hasn't been since the communist revolution.

The stock exchange is a pretty good example of the difference between a free economic system and a totalitarian economic system. In Russia, of course, capital is invested—huge sums of capital. But the state is the only investor. It makes all the decisions, to suit its own ends, and it implements those decisions with whatever force it deems necessary. The individual citizen has no voice in where the money goes, or what it is used to produce.

Under our free system, by contrast, the individual makes the choice. He buys or sells shares in one company or another on the basis of his own knowledge, judgment, and beliefs. He takes his own chances, and no commissar or bureaucrat tells him what industry he can or cannot invest his savings in. This is how economic democracy works in the American Republic.

The Russian newspapermen saw many a novelty in the broad USA. The stock exchange will be well up on the list.

Our Responsibility

"A world at peace can best serve mankind, and a strong and prosperous America is the greatest assurance of the attainment of a true and lasting peace."—FRED F. FLORENCE, *president, American Bankers Association.*

Sped-Up Production

In grandfather's time, 210 hours were needed to produce as much as a workman does today in 40 hours.—AMERICAN PETROLEUM INSTITUTE.

How do you choose self-supporting cable?

THERE ARE TWO TYPES OF 19 GAUGE SELF-SUPPORTING Ankoseal . . . EACH BEST FOR A SPECIFIC NEED

RURAL DISTRIBUTION WIRE

Without shield or jacket, the individual conductors are insulated with polyethylene plus a PVC outer covering made in three, six, eleven and sixteen pairs. The fully color coded pairs are cabled around a polyethylene insulated, high strength, 109 galvanized steel support wire. Suitable for fast, low cost construction to provide temporary service or cable relief.

TYPE 775-P-SS

This is the standard Ankoseal self-supporting cable, fully shielded and PVC jacketed for permanent installation. Made in six, eleven, sixteen and twenty-six pairs. Shielding protects against induced noise. The PVC jacket provides uniform transmission characteristics under all weather conditions. Elimination of the messenger speeds installation and reduces cost.

Technical service on specific installation requirements is available upon request from Ansonia.

ANSONIA
Ankoseal®
'The first all-plastic cable'

ANSONIA WIRE & CABLE COMPANY • ANSONIA, CONNECTICUT

XUM

News on New Products

TRUCK BODY — A new telephone service truck body has just been introduced by Stahl Metal Products, Inc.

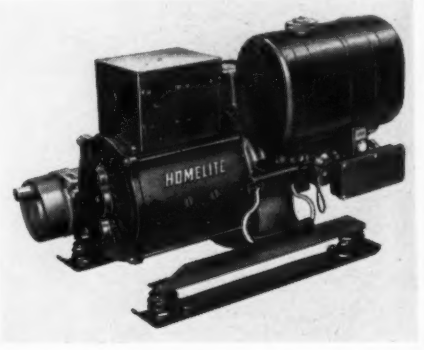
For telephone installation and maintenance work, the new Stahl TMI-76 body incorporates all the features of previous models. Slide-out reel tray, auto type cylinder locking door handles and convenient spare tire and wheel storage combine with easy-operating drawers and double-reinforced rear doors to make this a thoroughly useful and dependable unit.

TMI-76 is welded of auto body steel, reinforced at all strain points, prime painted or finish painted to order. Rear bumpers and ladder racks are optional extras. Bodies are shipped crated to

destination, at slightly lower freight costs than usual, or finish painted and mounted on chassis at the Stahl plants. NP479.

•

GENERATOR — Small size, light weight, close voltage regulation and generous overload capacity are among the features combined in the new 1,500-watt generator just announced by Homelite. The new 35A115 is a 115-volt, 60-cycle ac generator. It will op-



erate all types of portable electrical tools and provide standby power in emergencies.

Easily carried by one man, the new Homelite 35A115 weighs only 90 pounds, and delivers 1,500 watts of dependable power. Equipped with four conveniently located outlets, the 35A115 can operate several tools simultaneously.

"Close voltage regulation," the manufacturer claims, "is one of the most important features of this generator. We have eliminated the complicated dc winding, commutator and dc brush rigging, and use a simple Germanium bridge rectifier for excitation. The generator is compound wound to maintain a constant voltage output as load is applied. This combination of static excitation and static control limits the voltage change to only 4 per cent from no load to full load, insuring longer electric motor life."

No intermediate couplings; the armature is keyed directly to the crankshaft of a Homelite single-cylinder, two-cycle engine. The 35A115 has a generous

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Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP479_____; NP480_____; NP481_____; NP482_____;
NP483_____; NP484_____; NP485_____; NP486_____;
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Name ..... Title .....
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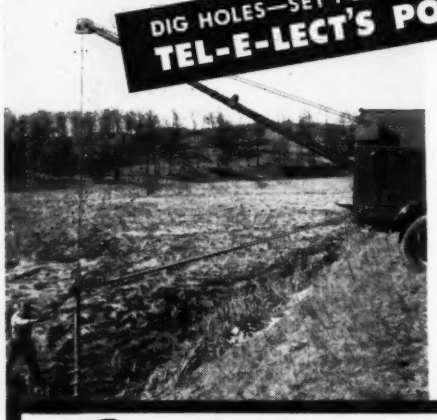
- Reaches hard to get at spots
- Bores holes up to 10 feet deep from any truck position
- Low cost—easy to use—easy to transport
- Industry tested and accepted

DIG HOLES—SET POLES WITH YOUR LINE TRUCK AND
TEL-E-LECT'S POLE HOLE DIGGER



When your derrick truck is equipped with a Tel-E-Lect Digger, your crew can dig a hole and set a pole in less than five minutes! This rugged auger, suspended from a front or rear mounted derrick, is raised or lowered by the winch line. Auger rotation power is supplied through a telescoping drive shaft connected to the PTO.

This efficient digger reaches up on a hill, down into ditches, or across obstacles . . . anywhere up to 20 feet behind the truck. The interchangeable hardened steel augers, 8" to 20" in diameter, are built to operate under the most rugged soil conditions.

Tel·E·Lect PRODUCTS, INC.
10,007 Minnetonka Boulevard Minneapolis 26, Minnesota

overload capacity to insure steady service and prevent tool stalling, even when starting loads exceed operating loads, it is said.

Completely new is the Electro-Mechanical Idle Control, available as an accessory for the 35A115. Containing only three parts; a rectifier, a relay and a solenoid, the Homelite Idle Control automatically switches the engine to idle speed when no current is drawn —immediately brings the engine to full speed when load is applied. Request NP480.

o

SNOWPLOW AND BACKFILL BLADE — The all-around utility of the new International four-wheel-drive model S-120 (4x4) has been extended for both winter and summer service by

attachment of a newly available snowplow and backfill blade, according to recent announcement by R. M. Buzard, manager of sales of the International Harvester Co. motor truck division.

"This double-purpose unit on our light-duty four-wheel-drive truck can be used for plowing snow, and then converted easily to a blade spreader or backfill blade when the weather changes," Buzard pointed out.

With the additional traction provided by the drive from all four wheels, he said, the International S-120 (4x4) with blade attachment will provide year-round service.

The blade is controlled from the instrument panel of the truck. Positive hydraulic power is provided by a pump run by the truck engine fan belt. Six-foot, 8-foot, or V-type blades may be ordered optionally. Blade can be centered for straight plowing, or angled to either side.

Automatic trip mechanism protects blade and truck from damage by hidden objects. This may be replaced by a "stiff link" to convert the snowplow to blade spreader or backfill attachment. As such, it may be used to backfill trenches, spread topsoil, sand, or gravel, or perform leveling jobs where heavy-duty machinery is not required.

Installation of the assembly is relatively simple, as it bolts on to the existing chassis. Drilling of holes or modification of front sheet metal is not re-

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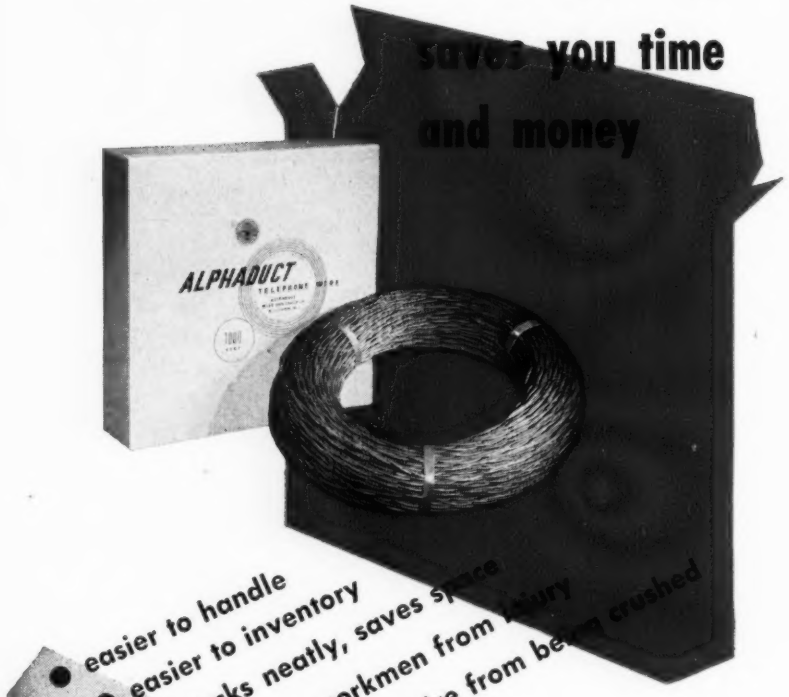
XUM

ALPHADUCT DROP WIRE carton packaging saves you time and money



- easier to handle
- easier to inventory
- stacks neatly, saves space
- saves workmen from injury
- prevents wire from being crushed

Once you start using Alphaduct Drop Wire you will find out that the handy carton packaging has real dollars and cents advantages.

Not only does your wire arrive in perfect condition, but the sturdy carton protects it all the while it's in your warehouse.

The cartons are easier to handle than loose coils. They can be stacked higher without danger of falling and the wire on the bottom will not be crushed or bent. Space is saved, inventory taking is simplified, and the possibility of injuries to workers from tumbling coils is removed.

We try to make Alphaduct the finest, longest lasting drop wire money can buy. Quality materials are used throughout, step-testing during every phase of manufacture assures uniform high standards. Alphaduct drop wire is dated with a color coded thread so you can tell for sure how long it lasts.

Try Alphaduct Drop Wire

ALPHADUCT WIRE AND CABLE COMPANY • MILLTOWN, NEW JERSEY

NATIONAL DISTRIBUTORS • LEICH SALES CORPORATION, CHICAGO, ILLINOIS
REGIONAL DISTRIBUTORS • PANKEY SUPPLY CO., CHARLOTTESVILLE, VA.
THE LINDSAY TELEPHONE SUPPLY CO., CLEVELAND, OHIO

GENERAL SYSTEM

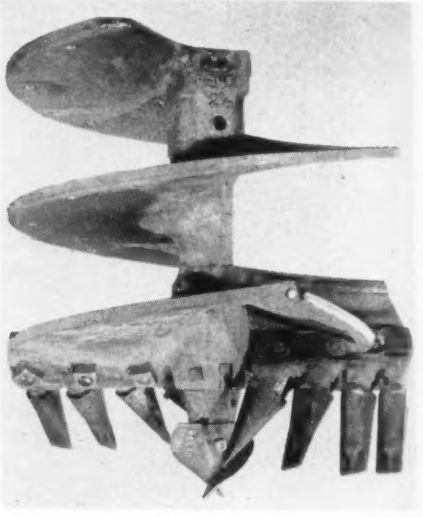
quired. Blade and A-frame assembly can then be connected or disconnected from the carrier quickly by installing or removing two pins.

The all-steel blade is welded throughout with formed ribs for rigidity reinforcing the heavy-gauge moldboard. Reversible carbon steel cutting blade and adjustable steel skid plates are attached to moldboard. Request NP481.

•

BORING AUGER TOOTH — A new reversible tooth in two sizes has been announced by Petersen Engineering Co., designed especially for use on earth boring augers and cutting heads.

The three outstanding features of these teeth are longer wearing surface,



reversibility, and positioning so as to bore without down-pressure. They are reversed after they are worn out on one side, and worn out again.

The more efficient boring angle permits boring in most instances without any down pressure at all, eliminating wear on clutch-plates and eliminating waste of power formerly required for down-pressure.

The new No. 49 PENGO Wisdom Tooth is especially designed for use on augers powered by heavy and extra-heavy duty boring machines and the No. 41 PENGO Wisdom Teeth are designed for use on medium and light weight machines. Request NP482.

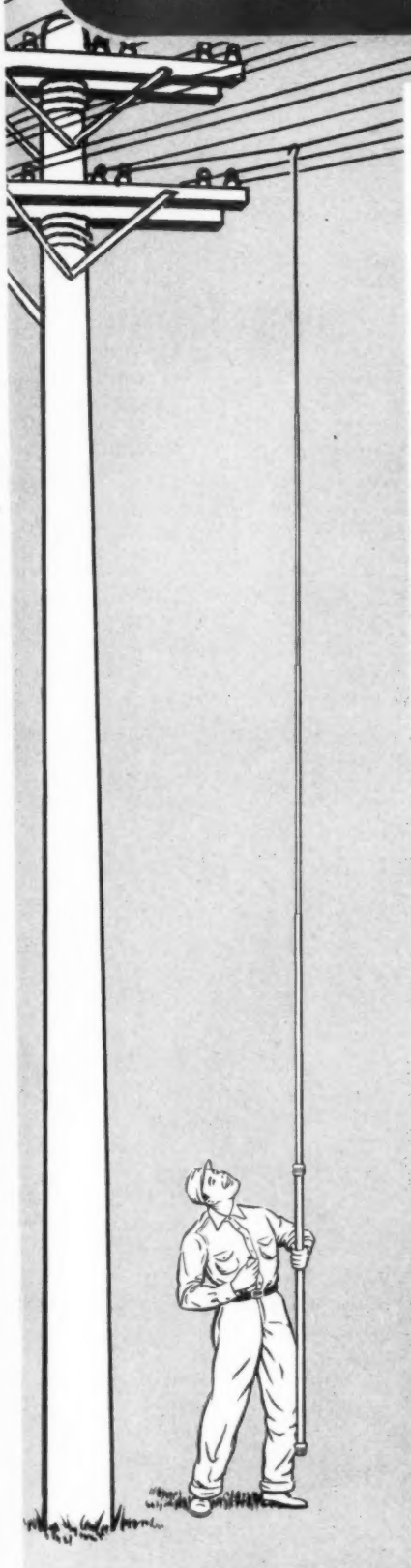
•

BOOTHS—The Suttle Equipment Co. has announced eight new types of telephone booths.

Model A-1—Handi-Booth—Of aluminum and safety glass construction, the *Handi-Booth* can be post or wall mounted (solid back) without high initial or installation cost. New corner extrusions make the booth dirt, dust and bug proof. There are no parts to rust. Lighted, new design plastic dome

NEW! BY THE MAKERS OF Actionrod FISHING TACKLE—

EXTENDO Fiberglass POLES

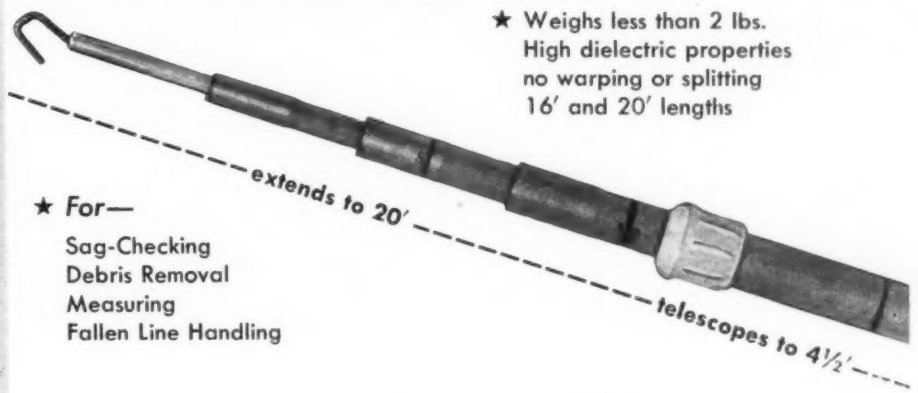


LIGHT . . . SAFE . . . CONVENIENT . . . DURABLE

Called by many the biggest improvement in line-handling tools in years, the EXTENDO fiberglass utility pole is an adaptation of the famous Extendo fishing rod. Light weight, compact, easy to carry and store, the Extendo is saving time and money for maintenance men throughout the country.

EXTENDO *Sag-Tester*

★ Weighs less than 2 lbs.
High dielectric properties
no warping or splitting
16′ and 20′ lengths



★ *For—*

Sag-Checking
Debris Removal
Measuring
Fallen Line Handling

EXTENDO *"Hot Stick"*

★ Weighs less than 7 lbs.
★ 24′ and 28′ lengths
★ High dielectric properties

★ Universal Head takes standard "fit-on" tools

★ Sections lock securely for both push and pull operations

Order* EXTENDO *Samples Today!

To: Orchard Industries, Inc., Hastings, Mich.

Gentlemen:

Please rush full information about your EXTENDO Fiberglass Poles.
Enclosed is our purchase order for samples.

( ) 16′ Extendo Sag Tester @ $17.50
( ) 20′ Extendo Sag Tester @ $25.00
( ) 24′ Extendo Hot Stick @ $64.50
( ) 28′ Extendo Hot Stick @ $78.50

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Lightweight durability in a wide variety of attractive arrangements.
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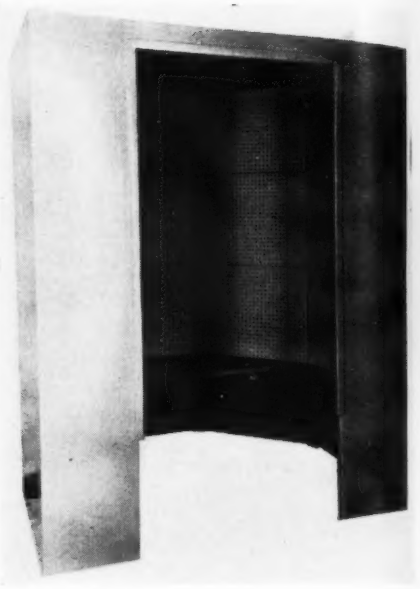
increases night revenue. Dimensions 18 inches long x 13 inches deep x 30 inches high. Request NP 483.

Model A-2 — Noiseless Booth (Outdoor)—Six-sided shape providing sound absorption and minimum maintenance for outdoor use in wood, stainless steel, or embossed aluminum paneling. No doors or breakable parts. Comp'ete with



mounting bracket for post mounting, or stand available. Withstands all weather conditions. Inside light is standard equipment. Available in colors to order. Dimensions 46 inches high x 32 inches deep x 35 inches wide. Stand 28 inches high. Request NP484.

Model A-3—Noiseless Booth (Indoor)—Utilizes the same six-sided shape as Model A-2 (outdoor noiseless) for indoor use and is available with wall mounting bracket or stand. Finishes:

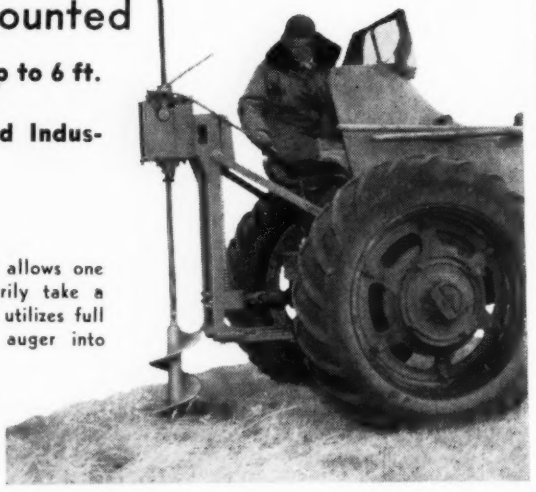
Natural, Mahogany, Walnut or any color. Inside light is standard equipment. Dimensions 36 inches high x 35 inches wide x 32 inches deep. Stand 38 inches high. Request NP485.

Model A-4—Oklahoma Booth—The wings provide privacy and keep merchandise at a satisfactory distance. A large shelf area is handy for making notes or depositing a purse or small change. Finishes available are Mahogany or dark Walnut, or any color. Dimensions 24 inches wide x 18⅛ inches deep x 25 inches high. Complete with mounting bracket. Request NP487.

NOW a Heavy Duty **INDUSTRIAL DIGGER** that is Tractor Mounted

- **Digs Faster . . . Deeper (up to 6 ft. through any kind of soil).**
- **Fits Most large Farm and Industrial tractors.**
- **One Man Operated.**
- **Amazing Low Cost.**

Prewitt's NEW INDUSTRIAL DIGGER allows one man to do the job it would ordinarily take a crew of men to do. P.T.O. driven, it utilizes full weight of rear of tractor to force auger into ground. Saves time and money!



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• Telephone Poles • Footings • Heavy Posts

FAMOUS PREWITT DIGGERS

HORIZONTAL INDUSTRIAL POST-HOLE

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SINCE 1929

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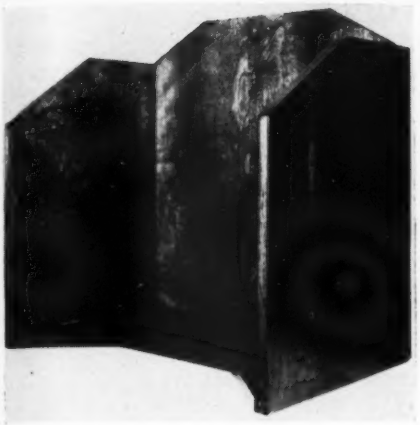
(See cut at top of page 55.)



AIR TREE PRUNER—A new type of portable air pruner designed to reduce tree trimming time by one-third has been introduced by Weed Control Service, Inc.

The Ackley air pruner is designed so that the motor is located next to the saw blade, and thereby uses a minimum of working parts.

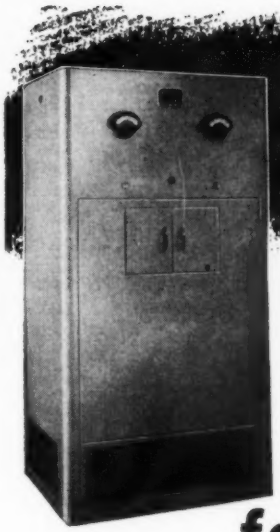
The entire unit weighs less than five pounds. Its light weight and easy han-

dling simplify the trimming process and reduce operating time, the company states.

The 7-inch blade revolves at 0-5000 rpm with a cutting capacity up to 4 inches. One of the advantages of the new pruner, according to the company, is the fact that one piece of equipment can be used for all trimming jobs. Earlier types of pruners cut only smaller limbs and it was necessary to use handsaws or other equipment for cutting through heavier branches.

The blade has an instantaneous vacuum brake which insures safety at all times. Both blade and brake are operated with fingertip controls.

Over-all length of the Ackley pruner is 76 inches, with fully insulated handle and extensions designed for quick



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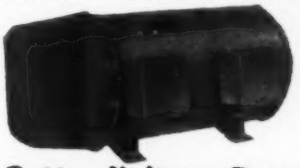
TO YOUR

ROTARY EQUIPMENT



for: • Better Voltage Regulation
• Sizeable Power Bill Savings

A telephone exchange now using DC generators for charging the batteries can add one or more FLOTROLS and immediately obtain the precise voltage regulation characteristics of the FLOTROL for the entire exchange. The high efficiency of the FLOTROL will greatly reduce power consumption during those hours of the day when the FLOTROL alone is sufficient to carry the entire load; generators can be shut off during light load periods, thereby reducing the wear on the rotating equipment. By installation of FLOTROL capacity sufficient to carry the entire normal load, rotating equipment showing signs of wear can be saved for standby service, continuing its life indefinitely. The advantages obtainable from this type of installation are tremendous. For further information, send for Bulletin 161.

FLOTROL
PARTNERS IN DEPENDABILITY
SUB-CYCLE

LORAIN PRODUCTS CORPORATION
1122 F ST. • LORAIN, OHIO

For reliable service . . .

telephone men call on

"YANKEE"®

Push Drill No. 41

Slip in the drill point — and the famous "Yankee" chuck makes sure it stays! No slippage or pulling out of points when drill is in use.

Magazine handle holds eight drill points, 1/16" to 11/64". All exposed parts of Push Drill No. 41 are chrome plated.

No. 41

Write for free "Yankee" Tool Book.
"Yankee" Tools, 212 W. Lehigh Avenue,
Philadelphia 33, Pennsylvania.

STANLEY

INSPECTION SERVICE
Of poles, crossarms, and preservative treatments. Analyses of wood preservatives. Consulting and specification writing. Inspectors stationed throughout U.S.A.
A. W. WILLIAMS INSPECTION CO.
MOBILE, ALABAMA
ESTABLISHED 1921—MEMBER A.C.I.L.

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DESIGN—SURVEYS—APPRAISALS—Construction and Maintenance of Overhead and Underground Telephone Plant. Complete supply of poles available for emergency requirements.
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NEALE CONSTRUCTION CO.
ENGINEERING • CONSTRUCTION • MAINTENANCE
TOPEKA, KANSAS PHONE 4-2621

coupling, making it possible to reach greater tree heights from power ladder equipment or from the ground.

The unit operates best at 140 PSI and uses 17 to 20 cubic feet of air.

The Ackley air pruner is also available in an angle head style for ground brushing. Request NP487.

John Douglas Named Manager Kellogg's Switchboard Sales

John S. Douglas has been named manager of the switchboard sales department of Kellogg Switchboard & Supply Co., a division of International Telephone & Telegraph Corp., according to an announcement by W. P. Hollis, sales manager.

J. S. DOUGLAS

Mr. Douglas joined the Kellogg company in March 1955 as an export sales engineer. He was appointed acting manager of the export department in August of that year.

Mr. Douglas, well known in the telephone manufacturing business for over 26 years, will supervise the sale of Relaymatic, Crossbar, PBX and PABX telephone equipment. His duties as acting manager of the export department will continue.

Mr. Douglas is a graduate of Northwestern University.

R. M. Ash Made Kansas City C & D Batteries Salesman

Robert M. Ash has been named sales and service representative for C & D Batteries in the Kansas City area, the company announced. Mr. Ash, with a law degree from the University of Minnesota, brings to the new post nearly a quarter century of experience in the battery business and related fields.

For 10 years, Mr. Ash was associated with Gould National Battery Co., first in their legal department, and then as assistant to the vice president handling battery sales programs in the East and Midwest.

From 1946 to 1948, following a stint with the U. S. Navy, he served as sales manager for Berg Gibson Mfg. Co., manufacturers of fast chargers.

In 1948, Mr. Ash bought an interest in the Diller Battery Corp., Des Moines, Iowa, finally becoming sole owner two years later. He headed the Diller company four years until he sold out in the fall of 1954.

Cook Appoints Milton Vail To Sales Engineering Post

Cook Electric Co., Chicago, has appointed Milton Vail as sales engineer with the Wirecom division according to William C. Strehl, sales manager of the division. He will serve the Independent telephone industry throughout the southwest and middle west states.

MILTON VAIL

Mr. Vail previously was with Kellogg Switchboard & Supply Co., Western Light & Telephone Co., and Suttle Equipment Co. For the last six years, he was owner and operator of Christian County Telephone Co., Ozark, Mo.

Save Money and Time!
TELEPHONE PRINTING SPECIALISTS FOR
TOLL TICKETS
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49 YEARS
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PWC®
ELECTRICAL WIRES, CABLES & CORD SETS

Aerial and Duct

TELEPHONE CABLES

PWC EXCHANGE CABLES . . .
are taking a prominent place in the current telephone expansion programs. Whether for metropolitan, suburban or rural locations, PWC cables will furnish years of dependable, trouble-free service.

PWC TYPE 144 Cables have polyethylene insulated conductors. The cable assembly is shielded with aluminum tape and jacketed with a hard service, long-aging polyvinyl compound. REA listed.

PWC TYPE 150 Cables are premium construction offering individually color coded polyethylene insulated pairs. They are shielded with .002" copper tape and jacketed with hard service, long-aging polyvinyl compound.

PWC TYPE 190 Cables are constructed with polyethylene insulation, aluminum tape shield and a new hard service polyethylene jacket. This jacket has excellent resistance to sun and moisture.

These are three of the eleven well known PWC telephone cable "Types" manufactured for the telephone industry today.

PLASTIC WIRE & CABLE CORPORATION

JEWETT CITY, CONN.

IN STOCK

★ **New type field wire,** D-1-A, tw. pr., 4 copper 3 steel strands per cond., plastic, nylon ins., latest army type tel. wire @ **$32.50/mile reel.** (Qty. discounts)

★ **W-110-B, tw. pr., WP tel. wire;** 4 steel 3 copper strands per cond., on One Mile steel reels, UNUSED @ **$12.00/mile reel.**

★ **Magneto Ringer Boxes:** W.E., Kellogg, Stromberg-Carlson, 5 bar-1600 or 2500 Ohm @ **$6.50 each.**

★ **W.E. # 392—Loud Ringing Bells, WP,** outside or inside use, w/6" gongs and condenser @ **$9.00 each.**

★ **W.E. Operator Head & Chest set,** New, complete w/#396 trans., #716 Receiver, cords and #289-B plug @ **$8.00 each.**

★★TELEPHONES:

★ **W.E. #250-AW, desk handset telephone,** latest style, dial blanked for C.B. or magneto **$11.00 each.**

★ **Stromberg-Carlson, #1243, desk handset phone,** self-contained, C.B., dial blanked **$14.50 each.**

★ **Automatic Electric, type #40 Monophone,** latest style, desk handset phone, self-contained, **complete with A.E. dial.....$17.50 each**
less dial .....**$14.50 each**

★ Note: All self-contained phones listed have straight-line ringers and are for C.B. or dial use.

All Material in Excellent Condition and Fully Guaranteed.

Other Makes of Telephones also in Stock.

Terms: Net; FOB New York.

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Distributors of Telephone Supplies
136 Maiden Lane New York 38, N. Y.
HAnover 2-9690

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When You Want It
Immediate Shipment from Nearest Warehouse Points
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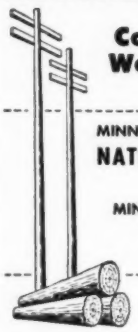
NORTHERN WHITE CEDAR



Coast Douglas Fir
Western Red Cedar

Plants and Yards:
MINNEAPOLIS, MINN. • SPOKANE, WASH.
NATIONAL POLE and TREATING DIVISION
MINNESOTA AND ONTARIO PAPER COMPANY
Minneapolis 2, Minnesota
Branch Offices:
CHICAGO • SPOKANE

POLES

B. J. Carney & Co., 100 N. 7th St., Minneapolis, Minn.—Western red cedar poles. Pentrex Butt Treated or Plain.

Cascade Pole Co., P.O. Box 743, Tacoma, Wash. — Creosoted Douglas Fir and Cedar Poles.

C. M. Christiansen Co.—Northern White Cedar Poles. Pentachlorophenol treated. Plant and Yards, Phelps, Wis.

Dierks Forests, Inc. (formerly Dierks Lumber & Coal Co.) Wood Preserving Division, 700 Dierks Building, Kansas City, Mo. Southern Pine select poles, all sizes and lengths, creosote and pentapressure treated. Prompt shipment.

Eppinger & Russell Co., 80—8th Avenue, New York 11, N. Y.—Creosoted Poles and Cross Arms. Plants: Jacksonville, Fla., Norfolk, Va., Eddington, Pa.

International Creosoting and Construction Co., Galveston, Texas.—Creosoted Southern Yellow Pine Poles. Plants Beaumont and Texarkana, Texas.

Kennedy Saw Mills, Inc., Box 54, Shreveport, La.—Premium poles, Penta or Creosote. Quick shipments.

Texas Creosoting Company—512 Main Street, Orange, Texas—Creosoted Southern Yellow Pine and Douglas Fir Poles. Can also treat with "Penta."

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Creosoting Co., Inc., 17 Battery Pl., N. Y. C.
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PLANTS AND OFFICES
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TIPTON, INDIANA
PHONE 125

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CONSTRUCTION COMPANY
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45 North Clark Street • Sullivan, Missouri

Protection at ½ or Less

MDF TYPES

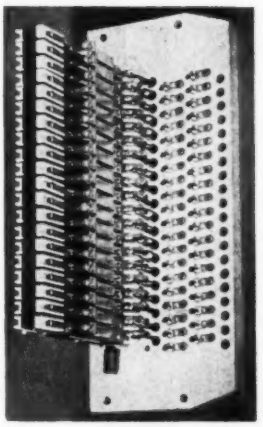
Western Electric

1435 W, 20 pair group consists of: #1269 A, 20 pr. prot. group complete with #76A heat coils, #26 & #27 dischargers, mounted on maple screw-terminal base—for wall mounting.

New—original factory carton—

A-1 ..... $15.00

(Note: By removing 2 bolts you have a standard #1269A group)



1435 W

1435 U, 20 pr. fuse groups, new, with 7A, 7 amp. fuses $5.00

MDF 1420 B, iron frame for mtg. ten 1435 W or U gps. floor type (against wall) 6½' high, 18" wide. New—(sold with order for prot. grps. only) $10.00

1269 A (W.E.) 20 pr. (see 1435 W above) fully equipped.
New $15.00
Reconditioned like new, fully equipped 10.00

1268 A (reconditioned only) 10.00

C 50 A (W.E.) 50 pr. (⅜" centers) equipped with #28 & #29 discharge blocks & #76A heat coils—New 47.50
Reconditioned like new 35.00

C 52 A, 52 pr. New $49.00—reconditioned 37.00

C 25 A, 25 pr. New 20.00—reconditioned 15.00

#675 (A.E.) 20 pr. (½" centers), equipped, new 12.50
Reconditioned 10.00

#100 (Cook) 20 pr. (½" centers), equipped, reconditioned 15.00
23 pr. as above 16.50

Open Wire & Cable Protection

W.E. #84A, 5 pr. block equipped with #26 & #30 discharge blocks (or 26 & 27), new $2.75
Less blocks, new 1.00
Ideal for protecting pole mtg. phantom repeating coils.

W.E. #83A (#84A in wp. mtg. box, equipped as desired) 5.00

TERMINALS, Cable (All New)

W.E. LA 16, with lead stub, protected, with cabinet, new $30.00
Equipped with 7A (7 amp.) fuses, #26 & #27 blocks 35.00

LA 26, with lead stub, less cabinet, new 25.00
Equipped with 7A fuses, #26 & #27 discharge blocks 32.50

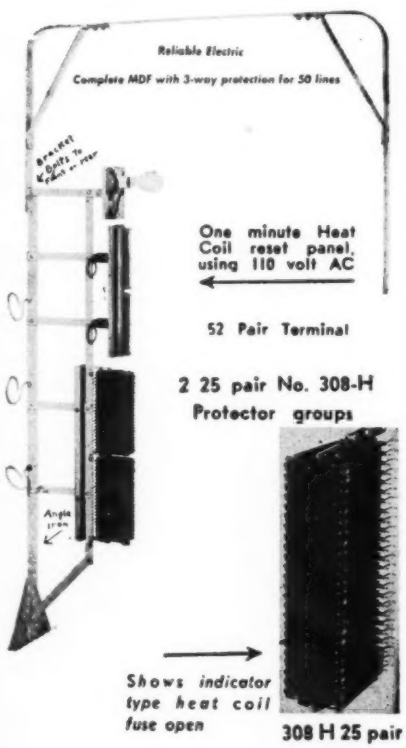
LB 26, with in & out lead stub, less cabinet (2 only), new 25.00
Equipped as above 32.50

Cook S-6, 16 pr. with lead stub, H-20 protection, new 24.50
Transmount equipment in stock at reduced prices (write)

Cook M-16, 51 pr., with stub $15.00

Cook, Uniflex, 51 pr., with stub 12.50

W.E. B 26, with stub 12.50
B 51, with stub 17.50
B 101, with stub 24.50
E 51, with stub 17.50
EA 51 pole box 19.50
F-10, with stub 10.00
F-26, with stub 17.50
H-51, with stub 16.00
G-51, with 6 ft. stub 15.00


Reliable Electric
Complete MDF with 3-way protection for 50 lines
Bracket Bolts to Wall at rear
One minute Heat Coil reset panel, using 110 volt AC
52 Pair Terminal
2 25 pair No. 308-H Protector groups
Angle Iron
Shows indicator type heat coil fuse open
308 H 25 pair

Shipping weight 77 lbs. **Complete 39.50**

Reliable, 50 pr. complete as shown, with MDF $39.50

308H (Reliable), 25 pr. grp. fully equipped, new $10.00

Substation Types

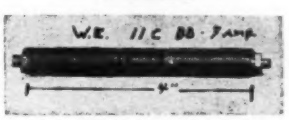
98A (W.E.) new (fob N.Y. or L.A.) $1.00

93 AW (W.E.) 98A in wp. mtg. can, new 2.00

Cook—similar to 0-9 type, outside, with H-20 protector unit equipped A-9 5 amp. Tru-Blo lavite fuses, also has jack (W.E. 223) for use with #47 plug. Size: 2"x3"x7" high, with bracket.

Cook cat. No. 523-1, pole jack, new $1.50
Less prot. #523-51, pole jack, new ..... .50
(sample on request)

FUSES



(Used with 98 A & 93 AW)

11 C, sealed can of 20, new $1.25
5 cans 5.00
7T-BB, 7 amp. for B box, new ..... .10

Fuses—indicator (grasshopper type) for swbd.
35 A (W.E.) 1½ amp. ..... $ .10
Per hundred 9.00
(Others, same type, lesser quantities)
Fuse Mountings—1 to 80 CKT types (write)
(W.E.) HEAT COILS, 76A, new ..... $ .10
(W.E.) Discharge Blocks, #26 & #27, new, pr. (one of each) ..... .10

Distributing Frames

W.E. #1425 Type—6 ft. (like new). 1 to 5 verticals—each vertical mounts 100 pair ½" center prot. grps. or 150 pair ⅜".

Per vertical, with dist rings, fanning strips ..... $ 25.00

5 vertical—welded one unit, 32" wide 100.00

Wall Brackets & Frames (many types)

MDF Wood Terminal Blocks, New, 6¢ pr.

Relay Racks

W.E. 19" 7', pedestal base $25.00
19" 12', pedestal base 40.00
19" 12", no base 30.00
23" Various heights

Kellogg—26", 7' 30.00

Power equipment Racks
(Write of your needs)

Repeating Coils—Relays, Keys
(Most everything for your plant)

—LET US QUOTE—

Shipped on approval
We pay two-way freight if not satisfied—
F.O.B. Los Angeles, Calif.

The Telectric Co.

1218 Venice Blvd. **Los Angeles 6, Calif.**

Richmond 8-2249

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Rates 15 cents per word payable in advance. Minimum charge $3.00 for 20 words or less.
Classified advertisements must reach us 8 days before publication date.

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Telephones

Kellogg #1000 Dial 30-42-54-66 cycle & S.L.	$15.00
Leich #600 Dial 30-42-54-66 cycle	15.00
Kellogg #925 Dial 30-42-54-66 cycle	9.00
Leich #90 Dial 30-42-54-66 cycle	8.50
Leich #86A Magneto (Compact)	12.00
W.E. 5 Bar with handset	9.00
W.E. 3 Bar with handset	8.00
A.E. Dials cleaned & tested	3.00
W.E. Dials cleaned & tested	3.50
E.I. Handsets with F.I. transmitter	2.50
Repeat Coils 27A-62A-62C-67C-91A-93G	5.00
Retard Coils 105D	5.00
Induction Coils W.E. 101A	1.00
Induction Coils Leich #27	1.50
W.E. Capsule Type Transmitter or Receiver in Bakelite Housing	1.00
Leich Ringers 30-42-54-66 cycle	1.00
Model B Subcycle refinished & tested	37.50
W.E. #392 Loud Bells with condenser refinished & tested	6.00
W.E. #35E Test Set	150.00
Protectors Central Office W.E. 68A with heat coils & carbons. Like new	10.00
W.E. 5 pr Cross Arm Arrestors 83A as removed from service	2.00
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Pay Stations. Any model except Semi Post Pay. Send us your requirements. From 5.00 to 95.00.

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MONTROSE, MICHIGAN
Telephone 3801-2211

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AUTOMATIC ELECTRIC 32-A-21 PAX 22 line system including switchboard, batteries, rectifier, and 29 PAX dial phones. Purchased new 1951. Replaced with larger board. Contact H. L. Phillips, El Dorado Refining Co., El Dorado, Kans.

NORTH CX-200-300 DIAL SWITCHBOARD. 300 lines, 11 trunks loop dialing, 13 paystation lines, 26 links, 1, 2, 4 and 10 party synchromonic ringing. Equipment includes test board and M. D. F. Will be available April 1. A real bargain f.o.b. our building. Telephone or write Sandhill Telephone Company, Aberdeen, N. C.

INSULATORS—Hemingray No. 10, 16 and 19.
¼-inch Guy Strand, 2500 ft. reels.
4 inch and 6 inch, 3 bolt Guy Clamps.
⅜x3½, ½x3½ and 4½ Lag Screws.
2x2x$\frac{1}{16}$ square galvanized washers.
¾-inch Insulated Staples at terrific discounts. 300 ft. 202 Pr. 19 ga Cable. Send us your inquiries.
GILMOUR SALES CO.
169 1st Ave. Salt Lake City, Utah

INSULATOR PINS
Size 1¼"x8" (Oak untreated) ½ Million
NEW—IMMEDIATE DELIVERY
Only 2 cents each for orders of 1000 or more
F.O.B. Salt Lake City, Utah
Advise: Truck or rail preference—Name of delivery carrier
GEORGE M. ACKER CO.
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FOR SALE

GROUND ANCHORS made by A. B. Chance—catalogue No. 10146. Helix size 10 inches, Rod size 1¼ inches by 66 inches L. These are new. We have approximately 100 of them and will sell at $6.00 each, freight prepaid, while they last, in lots of one or more. Transport Sales Co., 2705 N. Water St., Decatur, Ill.

RECONDITIONED TELEPHONE SETS

Western Electric #302 EW. Desk Sets	$14.00
Western Electric #250 AW. Desk Sets	11.00
KELLOGG #1100-BC. WALL SETS	14.00
KELLOGG #1000-BC. Desk Sets	14.00
Kellogg #9720—EXTENSION SETS	9.00

(Prices are F.O.B. Chicago, Ill.)
INDEPENDENT TELEPHONE REPAIR CO. 2137 West 21st St., Chicago 8, Ill.

2 POSITION AUTOMATIC ELECTRIC SWITCHBOARD 280 C.B. lines, 40 Lamp Signal Mag. lines, 10 toll lines, 15 Universal cords each position, including 24 V. battery, main frame, subcycle and test cabinet. Excellent condition (14 years old), now available, located at Wautoma, Wis. Priced at $2,000. Offers requested.

also

2 POSITION KELLOGG MAGNETO SWITCHBOARD 250 lines, 15 cord circuits with repeating coils each position. Good condition, now available, located at Whitehall, Wis. Priced at $150.

Call 7995 or write Community Telephone Company of Wisconsin, Black River Falls, Wis.

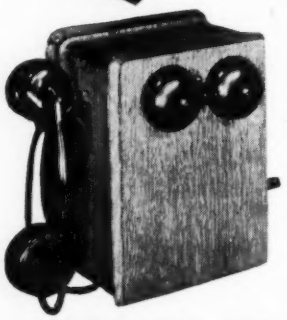
RECONDITIONED MAGNETO TELEPHONES

FEDERAL DESK OR WALL MAGNETO HANDSETS

#804-BA	with W.E. #BIAL 4300 ohm ringer
#804-CW	with 2000 ohm Ringer
#804-A	with 1000 ohm Ringer

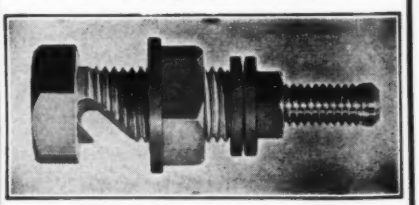
TYPE "C" HANDSET WALL MAGNETO TELEPHONES

5 Bar 1600 or 2500 ohm
3 Bar 1600 or 2500 ohm
Black Lacquer Finish Unless Oak is specified.



BUCKEYE TELEPHONE & SUPPLY CO.
1250 Kinnear Road HUdson 8-0655 Columbus 21, Ohio

No. 6A WESTERN ELECTRIC TYPE Bridging Connector



⅛" Hex Steel Body (slotted for No. 10 B.W.G.) Washer and Nut all zinc plated. Brass stud with 2 brass washers held in place with a hex brass nut. For use on iron to copper wire.
Price per hundred.....$28.00
ALL SHIPMENTS F.O.B. PHILADELPHIA

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3537 N. Hoyne Chicago, Ill.

Complete low cost Telephone Mapping.
Construction Maps — Key Exchange Town.
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POSITION WANTED

TEN YEARS WITH AUTOMATIC TELEPHONE MANUFACTURER—installing, manufacturing, sales experience. Desire permanent position with Independent company. Full qualifications upon request. Write Box 3801, c/o TELEPHONY.

HELP WANTED

PERSONNEL WORK — Excellent opportunity for young man to organize Department of Industrial Relations for rapidly expanding company having over 1,000 employees. Experience in telephone industry and personnel work highly desirable. College education preferred but not essential. Reply to Box 3797, c/o TELEPHONY.

COMMUNICATIONS ENGINEER: Engineer with experience in long distance telephone, telegraph and/or VHF radio systems and equipment for responsible position. Location, Syracuse, N. Y. Salary commensurate with experience. Send resume to: Gen'l Supt. of Communications, New York Central Railroad, New York City.

HELP WANTED—
STATION INSTALLERS
4 Years Experience
CENTRAL OFFICE INSTALLERS
4 Years Experience

Excellent opportunities with a fast-growing Southern California Independent Telephone Company. Submit complete résumé of experience, training and education, including references and recent photograph to: Box No. 3794, c/o TELEPHONY.

HELP WANTED

CABLE SPLICERS, Station Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 6100 N. 20th, Philadelphia, Pa.

DIVISION MANAGER—Extremely rapid growth has resulted in opening for Manager of Division having approximately 25,000 stations. Qualifications require ability to supervise Plant, Traffic, and Commercial Departments. Please send complete résumé to Box 3798, c/o TELEPHONY.

PLANT ENGINEERS for large Independent Telephone Company. Some experience necessary. In reply state age, educational and employment history. Address reply to Personnel Supervisor, Rochester Telephone Corporation, 10 Franklin Street, Rochester 4, N. Y.

CHIEF OUTSIDE PLANT ENGINEER for permanent position in Alaska's largest and fastest growing community. Must have broad experience in all phases of outside plant engineering and be capable of assuming related administrative responsibilities. Submit complete résumé of background first letter to Superintendent, City of Anchorage Telephone Department, Box 400, Anchorage, Alaska.

CENTRAL OFFICE EQUIPMENT MEN—Northern Ohio Telephone Company of Bellevue, Ohio, with 66 exchanges in Northern half of Ohio, offers steady employment at several of its District Headquarters exchanges. Fixed location, home each night (except in an emergency), automatic wage progression, holidays with pay, pension benefits, sick pay and hospitalization, with an operating company interested primarily in improving its service to over 93,000 subscribers. Write Eugene Alexander, Equipment Superintendent, Bellevue, Ohio, setting forth your experience and qualifications.

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Prefer men experienced in analyzing circuits and installation work, must be willing to TRAVEL. Liberal expense accounts, excellent opportunity for advancement, many company benefits.

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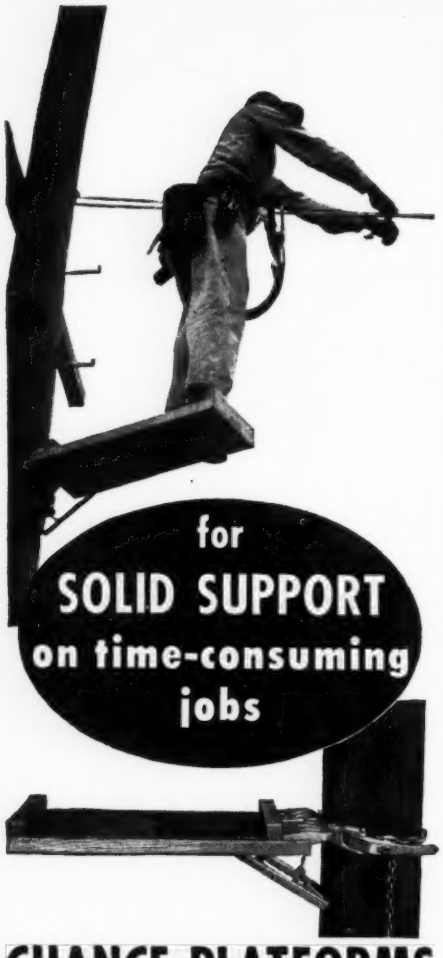
NO. 12 C B WESTERN ELECTRIC SWITCHBOARD POSITIONS — Require 20 positions—prepared to purchase single positions or complete switchboards—Write Box No. 3799, c/o TELEPHONY.



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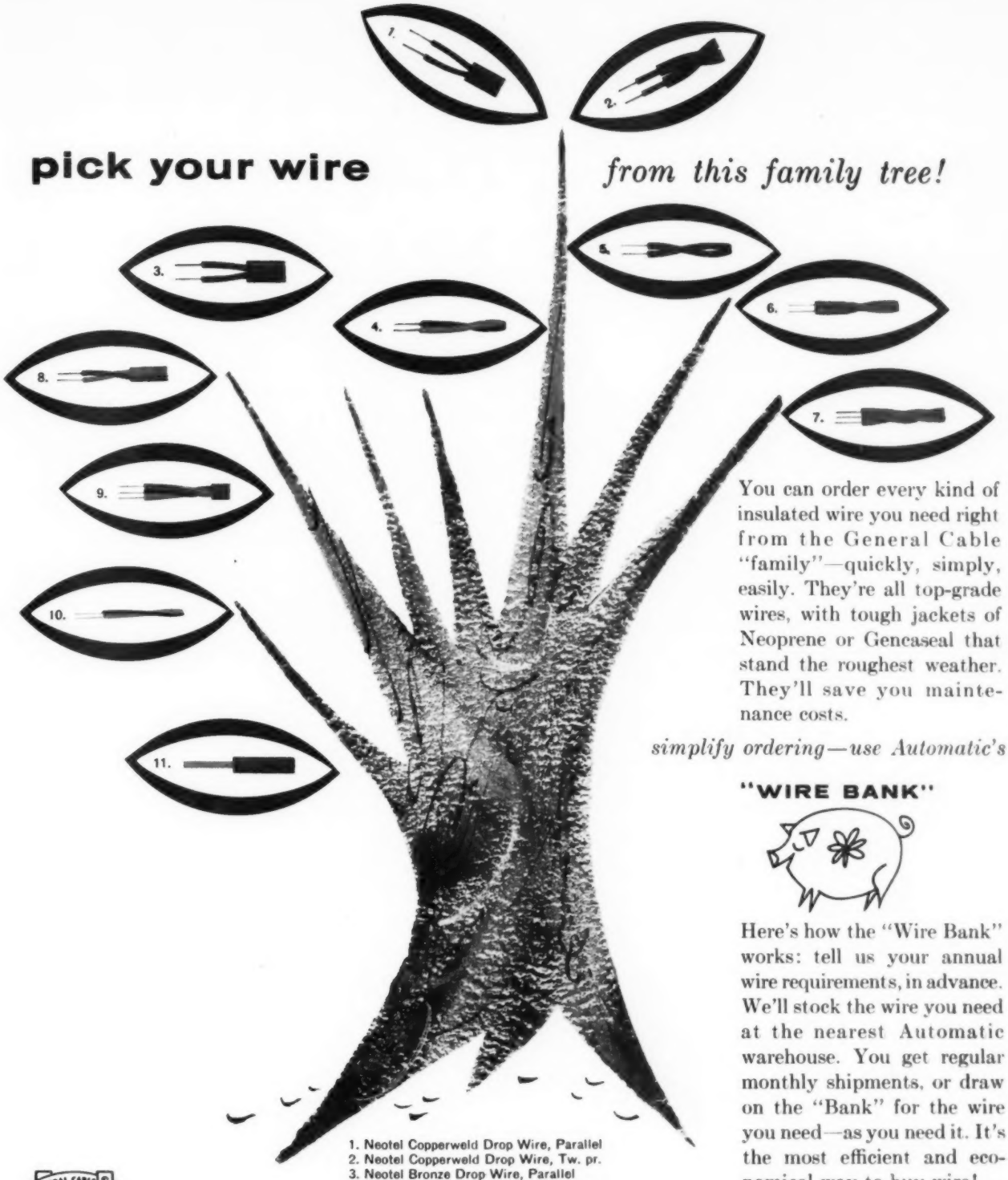

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